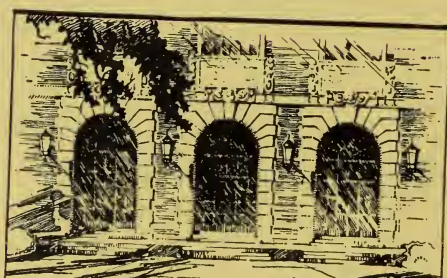


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FIFTEENTH ANNUAL REPORT

OF THE

BOARD

OF

WATER COMMISSIONERS

OF THE

CITY OF SAINT PAUL.

JANUARY 1, 1897.

ST. PAUL, MINN.:  
THE PIONEER PRESS COMPANY.  
1897.



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FIFTEENTH ANNUAL REPORT

OF THE

BOARD

OF

WATER COMMISSIONERS

OF THE

CITY OF SAINT PAUL.

Compliments of . . .

**The Board of Water Commissioners.**

JOHN CAULFIELD,

PLEASE EXCHANGE.

SECRETARY.



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FIFTEENTH ANNUAL REPORT

OF THE

BOARD

OF

WATER COMMISSIONERS

OF THE

CITY OF SAINT PAUL.

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JANUARY 1, 1897.

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ST. PAUL, MINN.:  
THE PIONEER PRESS COMPANY.  
1897.



# OFFICERS

OF THE

## CITY WATER WORKS.

JANUARY 1, 1897.

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### BOARD OF WATER COMMISSIONERS.

R. B. C. BEMENT, President. Term expires Jan. 1, 1901.

JOHN H. WOLTERSTORFF. Term expires Jan. 1, 1901.

J. F. HOYT. Term expires Jan. 1, 1900.

H. E. STEVENS. Term expires Jan. 1, 1898.

THOS. GRACE. Term expires Jan. 1, 1899.

---

JOHN CAULFIELD, Secretary.

A. R. STARKEY, Superintendent.

L. W. RUNDLETT, City Engineer and Engineer of the Board.

MARTIN FEIST, Chief Engineer and Engineer of McCarron Lake Station.

M. THOMMES, Assistant Engineer of McCarron Lake Station.

H. GEISLER, Gate Keeper and Engineer of Vadnais Lake Station.

A. A. THOMPSON, Assistant Engineer of Vadnais Lake Station.

JACOB ABRESCH, Engineer of Centerville Station.

JOS. DOERR, Engineer of West St. Paul Station.

F. J. KENNY, Assistant Engineer of West St. Paul Station.

GEO. DOORLEY, Meter Inspector.

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FIFTEENTH ANNUAL REPORT  
OF THE  
BOARD OF WATER COMMISSIONERS  
OF THE  
CITY OF ST. PAUL.

OFFICE OF THE BOARD OF WATER COMMISSIONERS,  
ST. PAUL, MINN., Jan. 1, 1897.

*To the Honorable the Mayor and Common Council of the City of St. Paul,*

GENTLEMEN: The Board of Water Commissioners of the City of St. Paul herewith presents its fifteenth annual report.

The incidents of the year briefly are as follows:

For the first time water was let into the new concrete conduit, constructed in 1895, but not used or accepted up to Jan. 1, 1896, connecting Otter lake with the open conduit leading to Pleasant lake. The gates at Otter lake were opened in July, and water let in for the purpose of testing the conduit as to its capacity and condition for acceptance. It was found to be tight and in good condition.

11 Feb  
It was originally estimated that 15,000,000 gallons could be put through this conduit in twenty-four hours, but by actual measurement it was found to deliver over 18,000,000 gallons of water in twenty-four hours. In making the test it was ascertained that ten inches in the level of the water of Otter lake furnished 108,000,000 gallons of water by weir measurement. After these figures were determined the Otter lake supply was shut off and held as reserve supply.

After several years' experience it was found that the water pumped from Baldwin lake, the smallest and most shallow of the chain of lakes known as the Rice lakes, and the last one of them, in dry and seasons of low water, carried more or less vegetable matter in it, and to obviate this difficulty and to provide an additional supply of water, a wooden conduit of forty-two inches inside diameter was constructed from the weir chamber on the Otter lake conduit above referred to, to Centerville lake, which is a much deeper lake, and not only free from the vegetable growth which is found in Baldwin lake, but is situated at the head of the chains of lakes, and a much better quality of water, as is shown by analysis.

On the shores of Centerville lake there were sunk a series of twenty-eight artesian wells to increase the supply of water as well as the quality. These wells are all connected together by castiron pipes of proper capacity and connected directly with a new high-duty pumping engine, built by the E. P. Allis Company, of 15,000,000 gallons capacity in each twenty-four hours. The pumping engine was also connected to an intake pipe extending upwards of a thousand feet out into deep water in Centerville lake.

Two boilers were set up to furnish steam to this plant, one brought from Baldwin lake and the other from McCarron lake, and the plant is now set up and ready for service.

The Baldwin lake plant is now shut down, and the new supply to be used, the old one being kept as a reserve supply.

This new supply is estimated to furnish 15,000,000 gallons of water daily, when required; 10,000,000 from the wells, and the balance from the lake.

We have practically increased the supply of water when required over 10,000,000 gallons daily, and in our opinion, no extensions for additional supply will be required for many years to come.

A new force main of thirty-six inches inside diameter castiron pipe was laid from the McCarron lake pumping station to the reservoir.

Owing to delays in receiving the castiron specials this work was carried over late into December, and it was deemed unwise and unnecessary to open the embankment of the reservoir, during the season of frost, to carry this pipe into the reservoir, and the work was stopped, but it will be finished early in the spring.

We now have two mains across the Rice street swamp, and any interruption of our high service supply is thus doubly protected.

From frequent analyses we find that the quality and condition of the water supplied this year has been improved over last year, and many less complaints have been received. We attribute this to the much larger infusion of artesian well water from Vadnais lake wells, and the higher stage of water in the lakes.

Your attention is called to the necessity for increased pumping facilities at our principal pumping station, McCarron lake. We now have three pumping engines there, as follows:

No. 1, 2,000,000 gallons daily capacity.

No. 2, 4,000,000 gallons daily capacity.

No. 3, 6,000,000 gallons daily capacity.

There are many days in the months of July and August when over 10,000,000 gallons are pumped, which is at the maximum capacity of the two largest pumps. Should anything happen to either of these large pumps, incapacitating them for duty, there would be a shortage of water over the actual requirements.

It is therefore recommended that No. 1 pump be sold, it being the least economical and the oldest and most obsolete type of engine, and a new pump of 10,000,000 gallons daily capacity substituted, which will then give us a pumping capacity of:

One pump, 4,000,000 gallons daily capacity.

One pump, 6,000,000 gallons daily capacity.

One pump, 10,000,000 gallons daily capacity.

Which will cover all possible requirements for many years to come.

The city engineer has prepared plans and specifications for this proposed new engine, and when ordered bids can be taken. It will take at least nine months before an engine of this capacity can be built and set up, ready for use.

The city comptroller has acknowledged the correctness of the claim, that our sinking fund should be credited with the interest earned on the uninvested balances detailed in our last report, and has credited our sinking fund with \$1,203.08 on this account.

Last year we called your attention to the error in the report of the city comptroller of the total cost of the water works to the city, which as yet has not been corrected, and the total cost as shown in his report for 1896 is \$5,129,770. The books of this department make the total cost only \$3,758,857, made up as follows:

Original purchase .....	\$510,000.00
Extensions (city work).....	1,961,626.00
Construction (outside of city, additional supply, etc.)	1,237,267.00
Meters .....	49,964.00

---

Total (as may be seen in our trial balance)..... \$3,758,857.00

To the above actual cost the city comptroller has added the following:

Total that has been paid for general maintenance...	\$392,266.00
Total that has been paid for repairs.....	53,752.00
Total that has been paid for interest.....	1,290,542.00

---

Total .....	\$1,736,510.00
Less sinking fund.....	375,647.00

---

Total added by comptroller to our cost..... \$1,360,913.00

It is manifestly absurd to add these three last items as a cost of the works to the city, for it all has been paid for out of the earnings of the department, and is more in the nature of a fixed charge.

Maintenance and repairs are manifestly an expense, just as much as fuel or salaries, which is included in those items in our books.

Suppose a railroad company should add maintenance and interest each year as a cost of their roadbed, the cost per mile would soon be utterly absurd.

If these additions are made in the comptroller's statement for the sake of making a larger showing of assets belong to the city, the figure should have been reached in another way, and the present worth or

value of the water works determined by capitalizing them at a figure which, at say four per cent, the net earnings of the department would pay interest upon.

We only call attention to this point because we have been frequently asked to explain the discrepancy between our figures of cost and that shown in the comptroller's report.

(Signed)

R. B. C. BEMENT,  
THOS. GRACE,  
J. F. HOYT,  
JOHN H. WOLTERSTORFF,  
H. E. STEVENS.



# SECRETARY'S REPORT.

OFFICE OF THE BOARD OF WATER COMMISSIONERS,  
ST. PAUL, MINN., Jan. 1, 1897.

To the Board of Water Commissioners,

GENTLEMEN: I herewith submit my fifteenth annual report, with accompanying statements and tables, showing in detail under appropriate heads the financial operations of the Water Department for thirteen months ending Dec. 31, 1896; also, comparative statements of receipts and disbursements from Aug. 10, 1882 (the time of the purchase of the works by the city) to date.

This report covers a period of thirteen months. Our previous reports closed with a year ending December 1st, and to conform with the fiscal year of the other departments of the city, the board by resolution ordered this year's report and all succeeding reports to be dated January 1st.

## REVENUE. (See Table No. 2.)

Balance on hand last report, Dec. 1, 1895, in city treasury....	\$48,670.11
General water receipts.....	\$190,714.78
Miscellaneous water receipts.....	19,546.26
Connections (street service).....	11,874.72
Extensions .....	1,283.51
Frontage tax.....	123,172.48
Shutting off and turning on water.....	31.00
Construction .....	175.50
Sinking fund earnings.....	14,989.86
Sinking fund.....	4,061.60
Meter .....	58.60
	<hr/>
	365,908.31
Total .....	<hr/>
	\$414,578.42

## DISBURSEMENTS. (See Table No. 2.)

General maintenance.....	\$41,800.24
Connections (street services).....	13,004.79
Repairs .....	2,640.34
Meters .....	8,738.23
Extensions .....	64,925.03
Construction .....	116,564.23
Interest .....	122,627.50
Refunded frontage tax.....	168.43
Sinking fund.....	31,365.75
Sinking fund earnings.....	2,685.71
Total .....	<hr/>
	404,520.25
	<hr/>
Balance .....	<hr/>
	\$10,058.17

The general water receipts, including high and low service and meters for the thirteen months were one hundred and ninety thousand, seven hundred and fourteen dollars and seventy-eight cents (\$190,714.78).

For the purpose of comparing the receipts of 1895 and 1896, we will take the receipts up to Dec. 1, 1896, which amounted to one hundred and eighty-five thousand, one hundred and sixty-one dollars and seventeen cents (\$185,161.17), an increase of five thousand nine hundred and fourteen dollars and sixty-five cents (\$5,914.65) over the receipts for 1895, of which one hundred and ten dollars and seventy-four cents (\$110.74) was from the low service, five thousand, nine hundred and fourteen dollars and sixty-five cents (\$5,914.65) from meters, and a decrease of one thousand, one hundred and sixty-six dollars and sixty-one cents (\$1,166.61) from high service. The decrease of the revenue from high service semi-annual receipts is caused by the large number of meters that were placed in service during the past year.

Extension account is credited with one thousand, two hundred and eighty-three dollars and fifty-one cents (\$1,283.51), of which five hundred and ninety-four dollars and ninety cents (\$594.90) was for putting in large castiron services for automatic fire extinguishers and for large consumers, five hundred and thirty-nine dollars and eighty-three cents (\$539.83) was for condemned water pipe sold (authorized by the board), and one hundred and forty-eight dollars and seventy-eight cents (\$148.78) was for labor furnished, oil barrels, etc., sold.

Construction account is credited with one hundred and seventy-five dollars and fifty cents (\$175.50), of which one hundred and fifty dollars (\$150) was from the sale of an old boiler (authorized by the board) and twenty-five dollars and fifty cents (\$25.50) was for labor.

#### INTEREST, REPAIRS, EXTENSIONS, GENERAL MAINTENANCE AND OTHER ACCOUNTS.

One hundred and twenty-two thousand, six hundred and twenty-seven dollars and fifty cents (\$122,627.50), being the interest on the bonded debt, has been paid from the earnings of the works.

#### REPAIR ACCOUNT.

Twenty-six hundred and forty dollars and thirty-four cents (\$2,640.34) was paid on this account, of which twenty-four hundred and eleven dollars and nineteen cents (\$2,411.19) was on account of fire hydrants, one hundred and forty-seven dollars and twenty-eight cents (\$147.28) on account of valves, and eighty-one dollars and eighty-seven cents (\$81.87) on account of water mains, a total decrease of nineteen hundred dollars and sixteen cents (\$1,900.16) from the year previous.

#### GENERAL MAINTENANCE ACCOUNT.

Forty-one thousand, eight hundred dollars and twenty-four cents (\$41,800.24) was paid on this account. The expense of maintaining the four pumping stations and Dale street reservoir was eighteen thousand, nine hundred and forty-one dollars and fifteen cents (\$18,941.15) (see Table

No. 15), of which eighty-three hundred and nineteen dollars and eighteen cents (\$8,319.18) was for salaries, ninety-eight hundred and ten dollars and seventeen cents (\$9,810.17) was for fuel, three hundred and fifty-nine dollars and eight cents (\$359.08) was for waste and machine oils, three hundred and ninety-two dollars and twenty-seven cents (\$392.27) was for repairs, and sixty dollars and forty-five cents (\$60.45) for kerosene oil, leaving a balance of twenty-two thousand, eight hundred and fifty-eight dollars and nine cents (\$22,858.09) for salaries and labor of all officers, employes, office expenses, fuel, and all other expenses necessary for maintaining the works. (See Table No. 19 for comparative statement of the expenses of maintaining the pumping stations and reservoir for the past six years.)

#### EXTENSION ACCOUNT.

Sixty-four thousand, nine hundred and twenty-five dollars and three cents (\$64,925.03) was paid on account of city extensions. Included in this amount was the expense of an additional thirty-six inch force main laid from the McCarron lake pumping station to the reservoir, a distance of seventy-six hundred and eighty (7,680) feet, at an expense of forty-nine thousand, three hundred and forty-seven dollars and sixty-four cents (\$49,347.64), of which thirty-six thousand, thirteen dollars and sixty-seven cents (\$36,013.67) was for castiron pipe, eighteen hundred dollars (\$1,800) for valves, forty-nine hundred and seventeen dollars and ten cents (\$4,917.10) for specials, lead, yarn, drayage, and inspection, and sixty-six hundred and sixteen dollars and eighty-seven cents (\$6,616.87) for laying the same, including piling. Six hundred and forty-eight dollars and ninety-eight cents (\$648.98) was also expended in protecting the old twenty-inch force main crossing the swamp at Rice street.

#### CONSTRUCTION ACCOUNT.

One hundred and sixteen thousand, five hundred and sixty-four dollars and twenty-three cents (\$116,564.23) was paid on this account for the Otter lake conduit and the Centerville lake conduit pumping station, artesian wells and new pump at Centerville, and the completion of the artesian well plant at Vadnais lake.

#### PAY ROLL. (See Table No. 13.)

All of the work in laying water pipes the past season was done under contracts. The putting in of service pipes, additional fire hydrants, valves, and street sprinkling hydrants was done by day labor; also, work at the various pumping stations, lakes, and canals. The pay roll of all officers and employes for the thirteen months amounted to fifty thousand, four hundred and forty dollars and thirteen cents (\$50,440.13), and the monthly average of employes has been eighty-seven.

## SINKING FUND. (See Table No. 12.)

This fund now amounts to three hundred and sixty-five thousand, five hundred and ninety dollars and seventy-one cents (\$365,590.71). Your attention is respectfully called to Table No. 12, accompanying this report, showing the sinking fund investments, date of investments, date of certificates, when due, etc.

This account increased the past year twenty-eight thousand, six hundred and eighty dollars and four cents (\$28,680.04), of which fifteen thousand dollars (\$15,000) was paid from the earnings of the works, and thirteen thousand, six hundred and eighty dollars and four cents (\$13,680.04), being the interest earnings on the invested funds.

## CONTRACTS. (See Table No. 6.)

Contracts have been let since last report amounting to one hundred and seventy-seven thousand, two hundred and forty dollars and fifty-four cents (\$177,240.54), on which one hundred and fifty-seven thousand, eight hundred and fifty-six dollars and forty cents (\$157,856.40) has been paid, leaving a balance of nineteen thousand, three hundred and eighty-four dollars and fourteen cents (\$19,384.14) to be paid when contracts are completed.

On Dec. 1, 1895, date of last annual report, there was due on contracts, not then completed, the sum of twenty thousand, five hundred and four dollars and twenty-eight cents (\$20,504.28) on which twenty thousand, ninety dollars and ninety-nine cents (\$20,090.99) has been paid, leaving a balance of four hundred and thirteen dollars and twenty-nine cents (\$413.29) still due.

## BONDED DEBT. (See Table No. 7.)

No increase has been made in the bonded debt since May 1, 1890. The present bonded debt is two million, four hundred and sixty thousand dollars (\$2,460,000), the annual interest of which is one hundred and fourteen thousand, two hundred dollars (\$14,200), and is paid from the revenue of the works.

## FRONTAGE TAX. (See Table No. 11.)

There has been collected during the year by the county treasurer one hundred and twenty-three thousand, one hundred and seventy-two dollars and forty-eight cents (\$123,172.48) on account of frontage tax. Your attention is called to Table No. 11 accompanying this report, showing in detail the collections, balances, etc., for the various years this assessment has been made.

Your attention is also called to Table No. 21, showing the number of miles of mains laid annually, since Aug. 10, 1882 (when the city purchased the works), the cost of same, expenditures for construction outside of city limits, annual maintenance, number of taps, annual receipts from the consumers and the annual increase from same, frontage tax receipts and as-



assessments, and the number of miles of mains that will be dropped annually from the frontage tax assessments under the law passed by the legislature in 1895, exempting property in front of which water mains are laid from further assessments after having paid the ten years. From this table it appears that property in front of sixty-seven miles of mains is already exempt and eighteen and one-half miles additional will be exempt next year.

METERS. (See Tables Nos. 16 and 18.)

There are now in service 1,546 meters, an increase of 437 during the year, of which the department owns 1,500 and the consumers forty-six. Five hundred and forty-nine meters were tested.

The board, to encourage the general use of meters, still adheres to the practice of making no charge to the consumer for setting meters.

SERVICES. (See Table No. 14.)

During the year 540 applications have been made for service connections, of which 384 were on high service and 156 on low service. Total number of applications to date is 14,782, of which 8,497 are on high service and 6,285 on low service. There were 2,012 applications, and all on low service when the city purchased the works in August, 1882.

PLUMBING AND INSPECTION (See Table No. 20.)

Forty-nine plumbers were granted licenses during the year, and 1,173 permits were issued to them to do work in connection with the introduction and extension of water services, as against 1,170 in 1895, 1,065 in 1894, 1,362 in 1893, 1,649 in 1892, 1,991 in 1891, 2,182 in 1890, 2,424 in 1889, 1,707 in 1888, 1,610 in 1887, 1,497 in 1886, 1,454 in 1885 and 718 in 1884. In addition to the inspection and examination of all the work done by licensed plumbers, there were 1,233 special inspections, of which 495 were on high service and 738 on low service. Nearly all these special inspections were made at the request of consumers for change of rate. We have completed a general inspection on low service of all premises where water is used and are now engaged inspecting high service. Table No. 20 shows the character and number of hose violations reported to this department during the past season and also a comparative statement for years 1894, 1895 and 1896.

Respectfully submitted,

JOHN CAULFIELD,  
Secretary.



TABLE NO. 1.

Trial Balance, Dec. 31, 1896.

Account.	Dr.	Cr.
St. Paul water works (original purchase).....	\$510,000.00	
Bond account .....		\$2,460,000.00
General water receipts.....		2,050,691.67
Miscellaneous water receipts.....		253,031.14
Connection (services) .....		6,160.29
Extension .....	1,961,626.79	
General maintenance .....	396,266.90	
Repair .....	53,752.16	
Meter .....	49,964.55	
Construction .....	1,237,267.94	
Interest .....	1,290,542.61	
General water receipts (hydrant account).....		121,663.19
Sinking fund .....	365,590.71	
Sinking fund earnings.....		46,927.52
Shutting off and turning on water.....		2,207.00
Frontage tax .....		934,389.02
Bank of Minnesota.....	313.44	
C. L. Horst, city treasurer.....	9,744.73	
	<hr/>	<hr/>
	\$5,875,069.83	\$5,875,069.83

TABLE NO. 2.

## RECEIPTS AND DISBURSEMENTS FROM DEC. 1, 1895, TO DEC. 31, 1896.

Balance Dec. 1, 1895.....		\$48,670.11
General water receipts, high service..	\$69,659.80	
General water receipts, low service...	50,796.70	
General water receipts, meters .....	70,258.28	
	<hr/>	\$190,714.78
Miscellaneous receipts, builders.....	\$1,102.12	
Miscellaneous receipts, flushing sewers	752.31	
Miscellaneous receipts, filling cisterns.	473.32	
Miscellaneous receipts, sprinkling sts...	17,218.51	
	<hr/>	\$19,546.26
Connections (services).....		11,874.72
Extension .....		1,283.51
Frontage tax .....		123,172.48
Shutting off and turning on water....		31.00
Construction .....		175.50
Sinking fund earnings.....		14,989.86
Sinking fund .....		4,061.60
Meter .....		58.60
		<hr/>
Total receipts .....		\$365,908.31

## DISBURSEMENTS.

General Maintenance—		
Salaries .....	\$19,262.68	
Stationery and printing .....	2,017.57	
Miscellaneous .....	1,371.42	
Labor .....	7,469.16	
Material and fuel.....	11,070.09	
Stable—feed .....	338.64	
Stable—repairs .....	270.68	
	<hr/>	\$41,800.24
Connections—		
Labor .....	\$9,243.57	
Pipe .....	2,207.08	
Brass goods and stop boxes.....	455.28	
Tools and miscellaneous .....	1,098.86	
	<hr/>	\$13,004.79
Repairs—		
Hydrants—labor .....	\$2,317.96	
Hydrants—material .....	93.23	
Valves—labor .....	144.68	
Valves—material .....	2.60	
Mains—labor .....	61.03	
Mains—material .....	20.84	
	<hr/>	\$2,640.34
Meters—		
Labor and supplies .....	\$2,644.89	
Freight and meters.....	6,093.34	
	<hr/>	\$8,738.23
Extensions—		
Pipe and special castings.....	\$45,641.98	
Labor .....	13,575.05	
Tools and repairs of same.....	257.71	
Advertising .....	11.56	
Fire hydrants .....	924.55	
Valves and valve boxes.....	2,002.54	
Lead and hemp packing.....	1,343.82	
Lumber and material.....	747.00	
Miscellaneous and building account...	420.82	
	<hr/>	\$64,925.03
Construction—New Supply—		
Pipe and special castings.....	\$11,098.65	
Labor and contracts.....	96,294.93	
Tools and repairs of same.....	199.12	
Lumber and material .....	2,926.60	
Engineering and right of way.....	5,844.35	
Miscellaneous and building account...	200.58	
	<hr/>	\$116,564.23
Interest .....	122,627.50	
Refunded frontage tax.....	168.43	
Sinking fund .....	31,365.75	
Sinking fund earnings.....	2,685.71	
Total disbursements .....		<hr/>
		\$404,520.25
Balance .....		<hr/>
		\$10,058.17

TABLE NO. 3.

## RECEIPTS AND DISBURSEMENTS FROM AUG. 10, 1882, TO DEC. 31, 1896.

General water receipts, high service....	\$550,527.23	
General water receipts, low service.....	876,736.15	
General water receipts, meters.....	623,428.29	
	<hr/>	\$2,050,691.67
Miscellaneous receipts, builders .....	\$37,467.80	
Miscellaneous receipts, water carts.....	3,796.13	
Miscellaneous receipts, flushing sewers	11,571.62	
Miscellaneous receipts, filling cisterns.	20,322.09	
Miscellaneous receipts, sprinkling sts..	179,873.50	
	<hr/>	\$253,031.14
Connections (services) .....		292,380.47
Extension .....		31,335.73
Interest .....		67,964.84
Sinking fund .....		7,950.42
Frontage tax .....		936,940.79
Meter .....		58.60
Shutting off and turning on water....		2,207.00
Repairs .....		3,259.15
Construction .....		3,694.26
Bills payable .....		653,000.00
Bonds .....		2,110,000.00
General water receipts (hydrant acc't)		121,663.19
Sinking fund earnings.....		52,126.16
Total receipts .....		<hr/>
		\$6,586,303.42
DISBURSEMENTS.		
General Maintenance—		
Salaries .....	\$214,855.07	
Stationery and printing.....	14,624.24	
Miscellaneous .....	8,382.15	
Labor .....	56,684.77	
Material and fuel.....	92,886.59	
Stable—feed .....	5,434.39	
Stable—repairs .....	3,399.69	
	<hr/>	\$396,266.90
Connections—		
Labor .....	\$162,928.10	
Pipe .....	76,030.48	
Brass goods and stop boxes.....	39,016.25	
Tools and miscellaneous .....	8,245.35	
	<hr/>	\$286,220.18
Repairs—		
Hydrants—labor .....	\$36,046.07	
Hydrants—material .....	1,729.75	
Valves—labor .....	1,249.39	
Valves—material .....	547.02	
Mains—labor .....	15,190.03	
Mains—material .....	2,249.05	
	<hr/>	\$57,011.31
Meters—		
Labor and supplies .....	\$16,304.25	
Freight and meters .....	33,718.90	
	<hr/>	\$50,023.15
Extensions—		
Pipe and special castings.....	\$1,060,709.01	
Labor .....	622,024.84	
Tools and repairs of same.....	19,846.28	
Advertising .....	334.04	
Fire hydrants .....	97,499.23	
Valves and valve boxes.....	77,729.53	
Lead and hemp packing.....	67,054.79	
Lumber and material.....	22,760.58	
Miscellaneous and building account...	25,004.22	
	<hr/>	\$1,992,962.52
Construction (New Supply)—		
Pipe and special castings.....	\$187,066.71	
Labor and contracts.....	656,306.91	
Tools and repairs of same.....	5,374.74	
Lumber and material.....	90,477.60	
Freight .....	9,479.22	
Engineering and right of way.....	125,811.55	
Miscellaneous and building account...	18,960.70	
Reservoirs .....	147,484.77	
	<hr/>	\$1,240,962.20
Interest .....		1,358,507.45
Refunded frontage tax.....		2,551.77
Bills payable .....		653,000.00
Bond .....		160,000.00
Sinking fund .....		372,165.24
Sinking fund earnings .....		6,574.53
Total disbursements .....		<hr/>
		\$6,576,245.25
Balance .....		<hr/>
		\$10,058.17

No.	Name	Amount			Total
		1890	1891	1892	
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No.	Name	Amount			Total
		1890	1891	1892	
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ABSTRACT OF RECEIPTS FOR YEAR ENDING DECEMBER 31, 1896.—THIRTEEN MONTHS.

MONTH.	GENERAL WATER RECEIPTS.			MISCELLANEOUS WATER RECEIPTS.					Connection (Service).	Shutting Off and Turning On Water.	Repairs.	Extensions.	Construction (New Supply).	Bills Payable.	Bonds.	Interest.	Frontage Tax.	General Water Receipts, Hydrant Account.	Sinking Fund Earnings	Sinking Fund.	Meter.	Total Receipts.	
	Semi-Annual.		Meters.	Builders.	Water Carts.	Flushing Sewers, Hydrant Streams, Etc.	Filling Cisterns.	Sprinkling Streets.															
	High Service.	Low Service.																					
December, 1895.....	\$82.00	\$3,076.88	\$6,421.00	\$129.56		\$181.13	\$70.00		\$1,090.12	\$1.00		\$55.21											\$13,119.40
January, 1896.....	74.03	19,876.42	4,636.64	13.10		190.20	97.00		111.50	9.00		128.77							\$2,012.50				28,156.63
February, 1896.....	7,493.79	221.89	5,686.00	4.10		42.00	94.66	\$6,124.98	179.80	2.00		133.81	\$150.00						2,825.00	\$194.97			20,146.02
March, 1896.....	25,464.63	320.78	5,691.11	50.90		4.00	83.53	1,144.00	358.80	8.00		28.79					\$14,435.28		62.50		23.50	47,676.21	
April, 1896.....	742.43	426.88	4,783.54	227.86		2.00	71.83	1,577.82	1,026.62	1.00		4.22										8,864.20	
May, 1896.....	518.33	211.10	5,126.51	76.05		4.00	4.50		1,658.30										808.33	2,179.22			10,581.84
June, 1896.....	297.40	3,469.60	4,685.55	16.60		17.00	2.50	543.92	976.32			2.50									13.10	10,124.49	
July, 1896.....	239.73	20,162.14	6,663.50	98.49		83.00	5.50	5,225.57	1,490.00	3.00		286.86							6,013.45	1,497.30	4.00		41,772.54
August, 1896.....	6,855.78	740.20	5,590.49	58.78		16.83	13.00	1,944.28	1,124.66	1.00		88.94					103,947.13		600.00		6.00		120,987.09
September, 1896.....	26,700.36	248.40	5,845.06	183.01		32.00	6.00	125.61	1,063.81	5.00		89.49											34,298.74
October, 1896.....	592.45	78.60	6,415.27	88.00		18.75	6.50	532.24	1,489.11	1.00		16.00	3.65						1,180.00	190.11			10,611.77
November, 1896.....	376.60	66.07	5,179.92	59.63		89.00	13.50		481.14			78.04	14.00				4,790.07		1,203.08				12,351.05
December, 1896.....	122.27	1,897.74	3,533.60	95.95		71.50	4.50		824.54			370.88	7.85						290.00				7,218.83
Totals .....	\$69,659.80	\$50,796.70	\$70,258.28	\$1,102.12		\$752.31	\$473.32	\$17,218.51	\$11,874.72	\$31.00		\$1,283.51	\$175.50				\$123,172.48		\$14,989.86	\$4,061.60	\$58.60		\$385,908.31

ABSTRACT OF RECEIPTS FROM AUGUST 10, 1882, TO DECEMBER 31, 1896.

From Aug. 10, 1882, to Dec. 1, 1882.....		\$669.80	\$4,209.08	\$670.65	\$203.96	\$25.00	\$342.01	\$1,327.00	\$2,811.27	\$4.00	\$123.39	\$65.59		\$17,000.00								\$27,541.75
For year ending Dec. 1, 1883.....		43,544.40	22,854.92	1,436.00	625.72	247.10	2,518.01	5,646.15	7,876.31	30.00	833.73	5,886.71	\$403.15	111,000.00	\$150,000.00							352,902.20
For year ending Dec. 1, 1884.....		55,530.12	26,720.51	2,479.33	717.35	255.05	3,032.98	6,496.76	12,827.62	127.00	46.06	1,236.47	213.18	165,000.00	600,000.00		\$19,244.39					893,935.82
For year ending Dec. 1, 1885.....	7,199.82	66,282.94	29,482.99	2,716.67	559.55	575.50	2,305.99	7,071.95	21,909.84	46.00	1,638.83	896.71	30.90	50,000.00	400,000.00	1,666.67	\$12,269.90					604,654.26
For year ending Dec. 1, 1886.....	16,006.32	68,251.79	30,603.10	2,706.38	484.35	261.83	1,459.58	10,250.58	24,046.61	93.00	46.20	1,174.16	69.00	55,000.00			19,538.28					229,992.06
For year ending Dec. 1, 1887.....	22,246.71	76,773.38	36,366.50	3,688.81	405.55	1,054.50	1,543.84	24,316.50	27,880.01	257.00	62.58	2,782.43	122.50	95,000.00	200,000.00	2,455.00	32,495.91					527,452.42
For year ending Dec. 1, 1888.....	27,566.65	66,066.48	36,406.27	4,146.64	250.95	861.78	1,527.23	19,886.88	27,968.08	94.00	246.05	5,025.08	159.29	300,000.00	300,000.00	24,815.22	43,062.60					558,083.20
For year ending Dec. 1, 1889.....	36,968.72	114,864.37	36,540.55	5,753.11	219.45	591.80	2,186.81	14,547.15	40,418.34	170.00	61.15	3,929.72	502.91	360,000.00	360,000.00	13,201.10	55,066.01					685,021.19
For year ending Dec. 1, 1890.....	45,797.74	79,363.44	43,036.26	3,570.82	176.25	771.92	1,471.52	12,923.26	30,762.18	175.00	74.11	2,315.23		105,000.00	100,000.00	555.55	73,079.70					499,062.98
For year ending Dec. 1, 1891.....	55,662.84	51,798.39	52,110.06	3,520.31	153.00	3,276.34	1,188.14	13,668.03	24,260.02	216.00	42.33	3,016.68	6.50	20,000.00		399.72	88,987.80					318,296.16
For year ending Dec. 1, 1892.....	62,061.97	51,807.44	50,695.28	1,579.42		918.91	442.30	841.56	19,707.70	103.00	56.10	617.38	1,500.00	35,000.00		5,627.19	112,082.57					349,040.82
For year ending Dec. 1, 1893.....	66,859.64	51,601.66	59,133.91	1,701.63		764.32	169.84	16,169.84	14,770.65	644.00	28.62	646.19					107,899.11	\$121,663.10	\$10,384.63			453,215.55
For year ending Dec. 1, 1894.....	69,192.88	50,598.02	59,176.42	874.88		811.53	565.19	16,032.83	10,916.35	139.00		544.27	465.73				122,115.05		14,481.67	\$2,122.42		348,036.24
For year ending Dec. 1, 1895.....	70,704.14	48,788.22	59,754.16	1,521.03		403.43	317.01	13,476.50	14,349.87	78.00		1,915.60	44.70				147,171.40		12,270.00	1,766.40		372,500.46
For year ending Dec. 31, 1896.....	69,659.80	50,796.70	70,258.28	1,102.12		752.31	473.32	17,218.51	11,874.72	31.00		1,283.51	175.50				123,172.48		14,989.86	4,061.60	\$58.60	365,908.31
Totals .....	\$550,527.23	\$876,736.15	623,428.29	\$37,467.80	\$3,796.13	\$11,571.62	\$20,322.09	\$179,873.50	\$292,380.47	\$2,207.00	\$3,259.15	\$31,335.73	\$3,694.26	\$653,000.00	\$2,110,000.00	\$67,964.54	\$936,940.79	\$121,663.10	52,126.16	7,950.42	\$58.60	\$6,596,303.42







ABSTRACT OF DISBURSEMENTS FOR THIRTEEN MONTHS, ENDING DECEMBER 31, 1896.

NUMBER OF VOUCHER.	MONTH.	TOTAL AMOUNT.	GENERAL MAINTENANCE.							CONNECTIONS.				REPAIRS.						METERS.		EXTENSIONS.										CONSTRUCTION—NEW SUPPLY.										INTEREST.	REFUNDED FRONTAGE TAX.	BILLS PAYABLE.	BOND.	SINKING FUND.	SINKING FUND EARNINGS.
			Salaries.	Stationery and Printing	Miscella- neous.	Labor.	Material and Fuel.	STABLE.		Labor.	Pipe.	Brass Goods and Stop Boxes.	Tools and Miscella- neous.	HYDRANTS.		VALVES.		MAINS.		Labor and Supplies.	Freight and Meters.	Pipe and Special Castings.	Labor.	Tools and Repairs of Same.	Adver- tising.	Fire Hydrants.	Valves and Valve Boxes.	Lead and Hemp Packing.	Lumber and Material.	Miscella- neous and Building Account.	Pipe and Special Castings.	Labor and Contracts.	Tools and Repairs of Same.	Lumber and Material.	Freight.	Engineering and Right of Way.	Miscella- neous and Building Account.	High Service Reservoir.									
								Feed.	Repairs.					Labor.	Material.	Labor.	Material.	Labor.	Material.																												
7653 to 7699 inclusive.....	December, 1895	\$17,368.23	\$1,568.30	\$18.96	\$49.40	\$431.55	\$68.64	\$13.59	\$12.50	\$796.25	\$16.04		\$21.46	\$201.00	\$18.68	\$22.22				\$222.59	\$284.62		\$867.53	\$18.26					\$27.26	\$22.48		\$3,373.35		\$280.70			\$20.05	\$7,000.00					\$2,012.50				
7700 to 7754 inclusive.....	January, 1896	21,042.13	1,623.32	126.19	82.60	458.00	1,721.95	105.74	14.90	503.64	33.66	\$20.40		153.00		6.96				197.41	169.77		756.76	30.51					35.01	11.64		2,851.00	\$11.90	83.90		\$22.40	1.50	9,600.00				2,825.00	\$194.97				
7755 to 7820 inclusive.....	February, 1896	17,979.63	1,288.70	726.95	66.45	558.75	1,353.92	36.42	8.50	353.50			6.30	111.25						103.00	342.25		632.03	15.97					20.74		5,288.54		151.50		70.82		6,750.00	\$4.04 5.00									
7830 to 7890 inclusive.....	March, 1896	31,091.01	1,280.00	57.98	54.40	489.18	1,903.41		85.16	351.50			4.15	115.50	9.85	6.00				170.75	845.15	\$18.88	358.23	18.76					70.60		121.60	6.69	2.08		41.75	1.56	25,000.00				62.50						
7891 to 7939 inclusive.....	April, 1896	14,045.06	1,440.16	167.86	107.50	545.67	353.95		19.80	471.00	82.01	39.07	2.15	129.00						228.61	300.00		265.52	17.95					33.97		224.30		17.25		844.29				8,750.00	15.30							
7940 to 8005 inclusive.....	May, 1896	18,157.26	1,394.00	80.06	95.37	499.15	341.70	48.66	6.00	562.12	1,410.76	57.51	47.10	201.75	20.70	3.00		\$18.25	\$20.84	194.50	300.00		173.58	32.07					234.30		165.84	54.72	19.52		2,171.87	.56	7,000.00	11.09			2,179.22	803.33					
8006 to 8050 inclusive.....	June, 1896	19,164.37	1,474.50	30.42	97.76	703.00	1,254.77	.58	26.00	986.50	82.44	235.54	97.55	148.50		22.50				195.75				9.25	\$4.76		\$118.00	\$12.40	14.46		5,736.02	7.04	394.42		1,374.84	13.26	5,850.00	33.86									
8051 to 8116 inclusive.....	July, 1896	63,285.84	1,617.00	85.55	142.71	767.50	178.97		13.10	1,031.62	23.65		777.27	156.00				6.00		206.29	904.10	32,553.80	1,644.39		2.89	\$263.59	435.54	43.60	15.43	160.73	\$5,583.06	4,030.08	67.00	185.73		90.28	16.00	3,750.00	23.30			6,013.45	1,497.30				
8117 to 8185 inclusive.....	August, 1896	42,064.89	1,233.65	59.95	181.37	837.13	432.72	22.08	18.60	1,005.68	77.71		40.80	148.96		6.00				222.51	900.00	9,130.14	2,381.47	24.27	3.91	504.30	81.00	1,074.54	126.27		3,651.37	12,085.42		30.79		332.40	91.00	6,750.00	10.85			600.00					
8186 to 8245 inclusive.....	September, 1896	50,410.57	1,838.32	107.40	57.54	668.20	1,400.27	37.68	12.18	881.50	9.73	19.56	24.92	189.00	2.40	51.00				198.95	600.60	696.03	2,501.20	37.29			912.00	34.60	3.43	39.90	1,498.52	13,144.84	3.75	65.34		295.89	19.04	25,000.00									
8246 to 8336 inclusive.....	October, 1896	51,295.85	1,659.66	144.20	228.57	610.40	385.62	25.62	26.70	843.36	361.69	76.00	48.65	329.25	41.60	6.00	\$2.60	20.78		211.25	706.55	1,093.76	1,082.05	28.85		156.75	456.00	168.28	121.90	65.82	365.70	15,729.55	27.52	610.55		491.00	37.61	8,750.00	1.90			16,180.00	190.11				
8337 to 8417 inclusive.....	November, 1896	39,778.34	1,496.66	288.17	134.05	462.37	566.62	41.72	10.95	823.85	87.82		16.62	299.00		7.50		6.00		211.08	72.10	1,158.93	2,273.81						43.63	108.46	22,633.73	6.50	692.89		89.87		7,000.00	63.00			1,203.08						
8418 to 8479 inclusive.....	December, 1896	19,237.07	1,348.41	54.88	73.70	438.26	1,107.46	6.55	16.35	633.05	22.07	7.20	11.89	165.75		13.50				192.60	668.80	990.44	397.50	24.53							11.70		10,910.66	14.00	391.93		18.94		1,427.50				290.00				
Totals .....		\$404,520.25	\$19,262.68	\$2,017.57	\$1,371.42	\$7,469.16	\$11,070.09	\$338.64	\$270.68	\$9,243.57	\$2,207.08	\$455.28	\$1,098.86	\$2,317.96	\$93.23	\$144.68	\$2.60	\$61.63	\$20.84	\$2,644.69	\$6,093.54	\$45,641.98	\$13,575.05	\$257.71	\$11.56	\$924.55	\$2,002.54	\$1,343.82	\$747.00	\$420.82	\$11,098.65	\$96,294.93	\$199.12	\$2,926.60		\$5,844.35	\$200.58			\$122,627.50	\$168.43			\$31,365.75	\$2,685.71		

ABSTRACT OF DISBURSEMENTS FROM AUGUST 10, 1882, TO DECEMBER 31, 1896.

From Aug. 10, 1882, to Dec. 1, 1882.....	\$25,937.61	\$786.10	\$239.13	\$187.59	\$419.62	\$7.33	\$31.06	\$3.76	\$1,235.69	\$953.08	\$454.22	\$249.77	\$61.38	\$6.75	\$9.13	\$4.10	\$101.57	.....	\$9.00	\$302.55	\$6,999.75	\$3,197.85	\$22.26	.....	\$854.00	\$377.32	\$317.90	\$50.00	\$281.27	.....	.....	.....	\$1,558.80	\$8.00	.....	\$7,008.75	.....	.....	.....	.....	.....	.....			
From Dec. 1, 1882, to Dec. 1, 1883.....	336,959.86	3,787.00	558.90	376.80	1,774.93	56.39	192.88	134.55	5,581.76	2,432.73	1,429.23	447.61	566.81	16.20	9.00	21.99	1,185.13	\$41.61	46.50	930.44	27,867.06	20,687.84	1,019.92	\$15.90	4,420.00	3,624.95	1,325.27	363.01	1,952.27	.....	\$36,923.79	\$2,230.91	\$23,550.20	\$3,418.74	25,647.53	8,250.02	.....	28,371.39	.....	\$128,000.00	.....	.....	.....		
From Dec. 1, 1883, to Dec. 1, 1884.....	909,902.70	8,773.67	521.39	322.15	1,099.61	314.47	264.55	177.10	7,344.83	3,306.83	1,848.50	186.68	1,611.68	170.76	16.50	12.09	708.50	19.10	41.10	949.32	54,813.89	63,224.79	2,300.25	11.00	6,500.00	16,063.21	11,588.71	2,173.86	300.78	\$174,985.58	342,128.07	1,958.65	41,164.20	5,916.00	42,013.66	1,733.59	.....	50,337.33	.....	65,000.00	.....	.....	.....		
From Dec. 1, 1884, to Dec. 1, 1885.....	522,971.24	12,311.70	465.29	245.40	1,449.14	4,327.22	355.64	121.19	10,032.56	5,306.22	3,813.33	615.92	1,164.04	328.09	25.20	20.75	3,501.99	199.97	101.27	1,532.48	117,837.26	58,418.29	1,686.58	41.48	11,700.00	9,423.66	6,161.44	2,065.42	253.17	.....	30,246.40	313.22	2,395.46	7.92	4,790.76	2,394.20	.....	79,318.58	.....	150,000.00	.....	.....	.....		
From Dec. 1, 1885, to Dec. 1, 1886.....	310,326.31	11,836.17	458.07	330.14	1,262.60	3,640.38	323.56	125.72	12,068.54	7,506.58	3,034.86	562.27	1,878.27	183.00	26.95	22.15	2,199.29	124.45	91.68	1,364.67	69,803.89	49,113.19	1,955.02	2.72	8,736.00	4,213.52	3,671.32	1,113.23	82.65	.....	13,748.15	62.55	513.20	.....	4,717.87	615.60	.....	85,009.36	\$5.60	20,000.00	.....	.....	.....		
From Dec. 1, 1886, to Dec. 1, 1887.....	527,528.68	13,714.47	716.59	306.35	1,539.07	5,977.12	287.93	265.05	13,464.41	7,567.99	3,117.61	777.23	3,601.71	85.89	25.53	5.30	533.20	4.82	765.02	1,872.58	124,425.08	73,937.76	1,813.70	21.08	10,778.00	6,185.90	6,195.25	2,070.61	16.42	.....	24,581.76	143.34	522.12	.....	4,181.53	657.05	\$2,889.67	84,394.96	86.68	130,000.00	.....	.....	.....		
From Dec. 1, 1887, to Dec. 1, 1888.....	545,477.61	14,867.59	811.11	260.37	2,357.67	4,809.27	446.50	247.30	13,786.87	6,585.55	4,269.46	489.09	3,681.17	248.78	50.96	55.20	3,412.09	800.75	1,191.81	872.84	173,214.79	77,926.04	2,536.06	10.95	12,325.00	9,293.75	9,335.33	2,422.03	353.64	.....	1,432.44	3.25	392.13	10.12	2,188.50	1,450.14	92,250.73	100,280.39	138.34	.....	.....	.....	.....		
From Dec. 1, 1888, to Dec. 1, 1889.....	691,358.80	15,391.26	1,438.40	232.42	3,700.07	4,745.36	377.58	237.60	16,952.77	10,015.39	4,903.57	975.92	3,846.07	15.95	30.88	44.99	602.56	10.00	1,325.79	2,058.63	160,761.63	76,150.48	2,647.76	114.80	13,135.95	10,394.95	9,332.59	3,044.17	98.16	.....	17,763.04	21.88	1,068.66	.....	11,000.82	953.54	49,882.75	108,732.97	150.35	.....	\$160,000.00	.....	.....	.....	
From Dec. 1, 1889, to Dec. 1, 1890.....	409,266.23	18,949.46	1,166.07	640.83	6,794.46	7,791.91	472.08	267.94	16,553.71	7,816.23	4,742.29	757.56	2,975.59	79.47	13.95	30.68	356.69	.....	1,433.12	2,900.14	110,625.50	58,969.19	1,473.36	32.18	10,996.00	6,319.30	6,110.05	2,549.42	13,937.74	.....	10,005.20	180.24	11,414.56	21.23	4,180.34	194.92	29.80	113,431.27	54.05	75,000.00	.....	.....	.....		
From Dec. 1, 1890, to Dec. 1, 1891.....	319,762.62	18,569.44	918.82	477.17	5,636.28	12,202.91	477.84	191.36	12,692.08	6,445.61	3,064.10	386.97	2,974.80	50.48	30.00	.....	102.75	513.30	1,431.81	15,396.59	24,256.36	720.80	7.92	2,680.00	232.75	1,716.18	1,108.01	311.08	.....	30,491.06	23.24	1,753.78	.....	4,208.68	396.12	2,062.19	115,745.81	265.62	50,000.00	.....	.....	.....			
From Dec. 1, 1891, to Dec. 1, 1892.....	347,864.47	17,847.85	1,125.82	668.32	5,307.07	9,403.69	533.07	463.30	11,457.76	6,142.51	2,630.12	555.36	2,375.88	49.88	44.58	12.85	727.67	74.76	1,480.37	2,631.57	63,185.64	33,577.66	671.03	10.12	6,080.28	3,578.40	3,651.48	921.73	5,748.86	82.78	26,813.89	74.24	1,422.66	.....	11,235.25	1,561.13	137.30	114,302.78	338.41	10,000.00	.....	.....	.....		
From Dec. 1, 1892, to Dec. 1, 1893.....	449,121.54	19,193.64	1,478.56	1,054.17	5,464.32	8,533.04	406.79	274.32	12,969.55	4,532.25	2,893.97	520.64	2,558.12	131.21	3.00	.....	456.99	113.35	1,488.45	1,342.49	26,192.01	27,057.75	698.35	7.60	3,655.00	1,362.61	1,708.13	1,522.84	1,120.86	.....	1,582.09	80.80	705.30	.....	1,725.80	183.95	222.43	120,546.36	696.89	25,000.00	.....	\$172,047.82	.....	.....	.....
From Dec. 1, 1893, to Dec. 1, 1894.....	308,544.82	19,572.68	1,158.09	947.84	6,960.09	9,627.04	489.80	384.18	8,987.31	1,728.71	1,473.64	183.00	3,260.25	149.80	260.21	62.84	575.67	206.10	1,625.49	3,831.92	17,086.35	18,304.03	568.39	12.65	2,296.50	1,043.04	1,370.54	1,197.59	108.38	.....	3,971.92	50.67	1,312.67	96.86	451.05	314.55	.90	114,200.00	410.28	.....	81,481.67	\$2,122.42	.....	.....	
From Dec. 1, 1894, to Dec. 1, 1895.....	376,702.51	19,991.36	1,550.43	961.18	5,450.68	10,380.97	436.47	235.65	11,456.69	3,483.72	1,296.07	438.47	3,172.34	120.26	549.82	252.08	446.00	.....	2,439.05	4,593.12	46,856.99	23,628.56	574.49	24.99	2,208.95	3,410.73	2,625.88	1,411.87	318.12	890.70	20,324.17	32.54	1,245.97	8.35	2,066.61	47.31	.....	114,200.00	237.12	.....	87,270.00	1,766.40	.....	.....	
From Dec. 1, 1895, to Dec. 31, 1896.....	404,520.25	19,262.68	2,017.57	1,371.42	7,469.16	11,070.00	338.64	270.68	9,243.57	2,207.08	455.28	1,098.80	2,317.96	93.23	144.68	2.60	61.03	50.84	2,641.69	6,093.54	45,641.98	13,575.05	237.71	11.56	924.55	2,002.54	1,343.82	747.00	420.82	11,098.65	96,294.93	199.12	2,926.60	.....	5,844.35	200.68	.....	122,627.50	168.43	.....	31,365.75	2,685.71	.....	.....	
Totals .....	\$6,576,245.25	\$214,855.07	\$14,624.24	\$8,382.15	\$56,684.77	\$92,886.50	\$5,434.39	\$3,390.69	\$162,928.10	\$76,080.48	\$39,016.25	\$8,245.35	\$36,046.07	\$1,729.75	\$1,240.39	\$57.02	\$15,190.03	\$2,240.05	\$16,304.25	\$33,118.90	\$1,060,709.01	\$622,024.84	\$19,840.28	\$334.04	\$97,499.23	\$77,729.53	\$67,054.79	\$22,760.58	\$25,004.22	\$187,066.71	\$656,306.91	\$5,374.74	\$90,477.00	\$9,479.22	\$125,811.55	\$18,960.70	\$147,484.77	\$1,358,507.45	\$2,551.77	\$653,000.00	\$160,000.00	\$372,165.24	\$6,574.50	.....	.....



TABLE NO. 4.

STATEMENT SHOWING AMOUNT PAID THE CITY TREASURER AND WARRANTS DRAWN AGAINST SAME FROM DEC. 1, 1895, TO DEC. 31, 1896.

1895.		
Dec. 1....	Balance in treasury as per last report.....	\$48,670.11
Dec. 6....	Cash.....	\$1,000.00
Dec. 9....	Cash.....	1,000.00
Dec. 10....	Cash.....	1,000.00
Dec. 11....	Cash.....	1,000.00
Dec. 13....	Cash.....	1,000.00
Dec. 18....	Cash.....	1,000.00
Dec. 19....	Cash.....	1,500.00
Dec. 24....	Cash.....	1,000.00
Dec. 27....	Cash.....	1,000.00
		<hr/>
		\$9,500.00
1896.		
Jan. 6....	Cash.....	\$10,000.00
Jan. 9....	Cash.....	5,000.00
Jan. 13....	Cash.....	5,000.00
Jan. 16....	Cash.....	1,000.00
Jan. 18....	Cash.....	1,000.00
Jan. 22....	Cash.....	2,000.00
Jan. 28....	Cash.....	1,000.00
Jan. 31....	Cash.....	1,000.00
		<hr/>
		26,000.00
Feb. 5....	Cash.....	\$5,000.00
Feb. 8....	Cash.....	1,000.00
Feb. 11....	Cash.....	2,000.00
Feb. 15....	Cash.....	1,000.00
Feb. 18....	Cash.....	1,000.00
Feb. 20....	Cash.....	1,000.00
Feb. 21....	Cash.....	1,000.00
Feb. 24....	Cash.....	2,000.00
Feb. 27....	Cash.....	2,000.00
Feb. 28....	Cash.....	1,500.00
Feb. 29....	Cash.....	2,500.00
		<hr/>
		20,000.00
March 6..	Cash.....	\$10,000.00
March 9..	Cash.....	10,000.00
March 11..	Cash.....	2,000.00
March 12..	Cash.....	2,000.00
March 16..	Cash.....	2,000.00
March 17..	From county treasurer on account of frontage tax...	14,435.28
March 20..	Cash.....	1,000.00
March 21..	Cash.....	2,000.00
March 25..	Cash.....	1,000.00
March 27..	Cash.....	1,000.00
March 31..	Cash.....	1,000.00
		<hr/>
		46,435.28
April 2...	Cash.....	\$1,000.00
April 4...	Cash.....	1,000.00
April 7...	Cash.....	1,000.00
April 9...	Cash.....	1,000.00
April 13...	Cash.....	1,000.00
April 20...	Cash.....	1,000.00
April 22...	Cash.....	1,000.00
April 25...	Cash.....	1,000.00
April 30...	Cash.....	2,000.00
		<hr/>
		10,000.00
May 7....	Cash.....	\$1,000.00
May 8....	Cash.....	1,000.00
May 12....	Cash.....	1,000.00
May 16....	Cash.....	1,000.00
May 20....	Cash.....	1,000.00
May 23....	Cash.....	1,000.00
		<hr/>
		6,000.00
June 3....	Cash.....	\$1,000.00
June 8...	Cash.....	1,000.00
June 9....	Cash.....	1,000.00
June 12....	Cash.....	1,000.00
June 15....	Cash.....	1,000.00
June 18....	Cash.....	1,000.00
June 20....	Cash.....	1,000.00
June 23....	Cash.....	500.00

## ACCOUNT WITH CITY TREASURER—Concluded.

1895.		
June 25....	Cash.....	1,000.00
June 29....	Cash.....	1,000.00
June 30....	Cash.....	1,500.00
		<hr/>
		11,000.00
July 8....	Cash.....	\$10,000.00
July 10....	Cash.....	5,000.00
July 13....	Cash.....	5,000.00
July 15....	Cash.....	5,000.00
July 18....	Cash.....	2,000.00
July 20....	Cash.....	2,000.00
July 22....	Cash.....	1,000.00
July 24....	Cash.....	1,000.00
July 29....	Cash.....	1,000.00
July 30....	Cash.....	25.48
July 30....	Cash.....	500.00
		<hr/>
		32,525.48
Aug. 1....	Cash from county treasurer on account of frontage tax	\$103,947.13
Aug. 6....	Cash.....	1,000.00
Aug. 7....	Cash.....	1,000.00
Aug. 8....	Cash.....	1,000.00
Aug. 10....	Cash.....	1,000.00
Aug. 12....	Cash.....	1,000.00
Aug. 15....	Cash.....	1,000.00
Aug. 18....	Cash.....	1,000.00
Aug. 21....	Cash.....	1,000.00
Aug. 22....	Cash.....	3,000.00
Aug. 26....	Cash.....	1,000.00
Aug. 27....	Cash.....	1,000.00
Aug. 28....	Cash.....	1,000.00
Aug. 29....	Cash.....	1,000.00
Aug. 31....	Cash.....	2,500.00
		<hr/>
		121,447.13
Sept. 5....	Cash.....	\$20,000.00
Sept. 10....	Cash.....	2,000.00
Sept. 12....	Cash.....	2,000.00
Sept. 14....	Cash.....	2,000.00
Sept. 16....	Cash.....	2,000.00
Sept. 17....	Cash.....	1,000.00
Sept. 19....	Cash.....	1,000.00
Sept. 22....	Cash.....	1,000.00
Sept. 24....	Cash.....	1,000.00
Sept. 25....	Cash.....	2,000.00
Sept. 29....	Cash.....	1,000.00
Sept. 30....	Cash.....	500.00
		<hr/>
		35,500.00
Oct. 6....	Cash.....	\$1,000.00
Oct. 9....	Cash.....	1,000.00
Oct. 13....	Cash.....	1,000.00
Oct. 16....	Cash.....	1,000.00
Oct. 17....	Cash.....	1,000.00
Oct. 19....	Cash.....	1,000.00
Oct. 24....	Cash.....	1,000.00
Oct. 28....	Cash.....	1,000.00
Oct. 29....	Cash.....	600.00
Oct. 31....	Cash.....	1,000.00
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		9,600.00
Nov. 6....	Cash.....	\$1,000.00
Nov. 7....	Cash.....	1,000.00
Nov. 10....	Cash.....	1,000.00
Nov. 18....	Cash.....	1,000.00
Nov. 20....	Cash.....	1,000.00
Nov. 21....	From county treasurer, ac- count frontage tax.....	4,790.07
Nov. 27....	Cash.....	1,000.00
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		10,790.07
Dec. 7....	Cash.....	\$1,000.00
Dec. 8....	Cash.....	1,000.00
Dec. 11....	Cash.....	1,000.00
Dec. 14....	Cash.....	1,000.00
Dec. 15....	Cash.....	1,000.00
Dec. 16....	Cash.....	1,000.00
Dec. 24....	Cash.....	1,000.00
Dec. 28....	Cash.....	745.45
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		7,745.45
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		346,543.41
Total .....		\$395,213.52

TABLE NO. 5.

WARRANTS DRAWN ON CITY TREASURER FROM DEC. 1, 1895, TO DEC.  
31, 1896, INCLUSIVE.

1895.				
Dec. 2.	Warrants Nos. 7653 to 7654 inclu.	\$11,114.58		
Dec. 6.	Warrants Nos. 7655 to 7699 inclu.	4,241.15		
			\$15,355.73	
1896.				
Jan. 2.	Warrants Nos. 7700 to 7708 inclu.	\$13,714.39		
Jan. 14.	Warrants Nos. 7709 to 7754 inclu.	4,907.77		
			18,622.16	
Feb. 1.	Warrant No. 7755.....	\$2,901.39		
Feb. 7.	Warrants Nos. 7756 to 7820 inclu.	14,560.51		
Feb. 19.	Warrants Nos. 7821 to 7829 inclu.	517.82		
			17,979.63	
Mar. 2.	Warrant No. 7830.....	\$2,632.43		
Mar. 12.	Warrants Nos. 7831 to 7890 inclu.	23,396.08		
			51,028.51	
April 1.	Warrants Nos. 7891 to 7894 inclu.	\$3,574.10		
April 8.	Warrants Nos. 7895 to 7939 inclu.	10,470.96		
			14,045.06	
May 1.	Warrants Nos. 7940 to 7956 inclu.	\$10,630.15		
May 6.	Warrant No. 7957.....	180.00		
May 9.	Warrants Nos. 7958 to 7992 inclu.	2,479.61		
May 12.	Warrant No. 7993.....	65.00		
May 18.	Warrants Nos. 7994 to 8000 inclu.	94.95		
May 19.	Warrants Nos. 8001 to 8002 inclu.	1,650.00		
May 23.	Warrants Nos. 8003 to 8005 inclu.	75.00		
			15,174.71	
June 1.	Warrant No. 8006.....	\$4,316.17		
June 3.	Warrants Nos. 8007 to 8047 inclu.	9,962.83		
June 23.	Warrants Nos. 8048 to 8050 inclu.	4,885.37		
			19,164.37	
July 1.	Warrants Nos. 8051 to 8071 inclu.	\$32,219.45		
July 8.	Warrants Nos. 8072 to 8101 inclu.	16,908.53		
July 16.	Warrants Nos. 8102 to 8116 inclu.	5,647.11		
			54,775.09	
Aug. 1.	Warrant No. 8117.....	\$4,349.36		
Aug. 11.	Warrants Nos. 8118 to 8185 inclu.	37,115.53		
			41,464.89	
Sept. 1.	Warrant No. 8186.....	\$4,869.61		
Sept. 10.	Warrants Nos. 8187 to 8245 inclu.	45,540.96		
			50,410.57	
Oct. 1.	Warrants Nos. 8246 to 8263 inclu.	\$17,149.38		
Oct. 10.	Warrants Nos. 8264 to 8315 inclu.	15,301.48		
Oct. 13.	Warrant No. 8316.....	15,000.00		
Oct. 26.	Warrants Nos. 8317 to 8336 inclu.	2,474.88		
			49,925.74	
Nov. 2.	Warrant No. 8337.....	\$4,732.21		
Nov. 7.	Warrants Nos. 8338 to 8392 inclu.	29,317.48		
Nov. 24.	Warrants Nos. 8393 to 8417 inclu.	4,525.57		
			38,575.26	
Dec. 1.	Warrant No. 8418.....	\$4,078.14		
Dec. 8.	Warrants Nos. 8419 to 8463 inclu.	4,977.26		
Dec. 21.	Warrants Nos. 8464 to 8479 inclu.	9,891.67		
			18,947.07	
Grand total.....				\$385,468.79
Balance .....				\$9,744.73

TABLE NO. 6.

CONTRACTS MADE BY THE BOARD OF WATER COMMISSIONERS FROM  
DEC. 1, 1895, TO DEC. 31, 1896.

No.	Date of Contract.	With Whom and for What Purpose.	Amount of Contract.	Amount Paid.	Amount Due.
	1895.				
1	Dec. 7.	J. W. Cunningham & Co., printing annual report for 1895.....	\$641.25	\$641.25	
2	Jan. 15.	P. H. Kelly Merc. Co., lubricating oils .....	231.35	231.35	
3	Jan. 21.	National Meter Co., New York, water meters .....	5,384.55	5,384.55	
4	Mar. 2.	Sherwood, Sutherland & Co., driving piles.....	168.20	168.20	
5	April 15.	South Park Foundry & Machine Co., water gates.....	3,014.80	3,014.80	
6	April 15.	South Park Foundry & Machine Co., fire hydrants.....	924.55	924.55	
7	April 15.	Union Brass & Metal Manufacturing Co., brass goods.....	375.25	375.25	
8	April 29.	E. P. Allis & Co., Milwaukee, pumping engine, Centerville....	20,700.00	10,350.00	\$10,350.00
9	April 30.	The Western Supply Co., lead pipe and block tin.....	1,438.43	1,438.43	
10	April 30.	Jas. Sheely, drayage.....	1,116.86	1,116.86	
11	April 30.	Nic Feyen, laying pipe and connecting wells at Centerville....	2,996.76	2,996.76	
12	May 1.	St. Paul Plow Co., special castings for city extensions.....	1,132.72	1,132.72	
13	May 1.	J. F. McCarthy, St. Paul, wells at Centerville.....	16,639.43	16,639.43	
14	May 2.	The Ohio Pipe Co., Columbus, O., 6-12 and 16 in. cast iron pipe for city .....	6,000.23	6,000.23	
15	May 2.	Dennis Long & Co., Louisville, Ky., 24 & 36 in. castiron pipe for Centerville.....	5,607.79	5,607.79	
16	May 2.	M. J. Drummond, Lynchburg, Va., 6 in. to 20 in. castiron pipe for Centerville.....	1,960.61	1,960.61	
17	May 9.	St. Paul Foundry Co., castiron specials .....	5,635.74	5,635.74	
18	May 13.	Dennis Long & Co., Louisville, Ky., 36 in. castiron pipe, city..	36,013.37	36,013.67	
19	May 15.	Bingham & Taylor, Buffalo, N. Y., valve and stopcock boxes...	1,088.74	1,088.74	
20	May 15.	T. Brennan Lumber Co., lumber for Otter L. Conduit.....	1,659.56	1,659.56	
21	May 19.	Jose T. Million, laying water mains on Duke street.....	1,142.20	1,027.98	114.22
22	May 20.	Nic Feyen, drayage to Centerville	620.53	620.53	
23	May 20.	Patrick Doherty, laying water mains in city.....	3,440.53	3,108.50	331.94
24	May 20.	Hennessey & Cox, wooden conduit to Centerville.....	30,758.30	29,258.30	1,500.00
25	July 8.	Hennessey & Cox, pump house at Centerville .....	9,486.00	9,436.00	50.00
26	July 8.	John Kenny, boiler, McCarron Lake station.....	1,162.50	986.00	176.50
27	July 25.	Fairbank, Morse & Co., laying 36 in. water pipe.....	7,251.02	6,563.99	687.03
28	July 25.	N. W. Shot & Lead Works, 25 tons pig lead.....	1,413.15	1,413.15	
29	Sept. 28.	N. Feyen, removing two boilers to Centerville station.....	74.00	74.00	
30	Sept. 28.	S. Swanson, two artesian wells at Vadnais Lake.....	1,040.00		1,040.00
31	Oct. 10.	John Kenny, smoke stack, Centerville station.....	270.00		270.00
32	Oct. 10.	The Western Supply Co., 5 tons lead pipe.....	329.42	329.42	
33	Oct. 14.	Nic Feyen, grading on Centerville conduit .....	1,145.00	1,095.00	50.00
34	Oct. 29.	N. W. Fuel Co., coal and wood..	5,992.40	1,375.92	4,616.48
35	Oct. 29.	Pioneer Fuel Co., coal for Vadnais station .....	385.00	187.03	197.97
			\$177,240.54	\$157,856.40	\$19,384.14

TABLE NO. 6—Continued.

CONTRACTS MADE PREVIOUS TO DEC. 1, 1895, AND FOR WHICH FINAL SETTLEMENT WAS NOT MADE AT TIME OF LAST REPORT.

Date of Contract.	With Whom and for What Purpose.	Amount Due Dec. 1, 1895.	Amount Paid.	Amount Due.
1892.				
July 25.	Andrew Toomey, St. Paul, engine house, West St. Paul.....	\$50.00	\$50.00	
1895.				
April 29.	Patrick Doherty, St. Paul, laying water mains in Div. No. 1.....	425.82	425.82	
April 29.	Million & Young, St. Paul, laying water mains in Divs. No. 2 and 3....	979.61	979.61	
June 17.	E. P. Allis Co., Milwaukee, Wis., pumping engine at Vadnais Lake....	3,750.00	3,750.00	
June 19.	J. F. McCarthy, St. Paul, artesian well at Centerville .....	1,400.00	1,400.00	
July 17.	Ransom Subway Co., Chicago, conduit to Otter Lake.....	5,025.79	4,612.50	\$413.29
Aug. 10.	Chas. Stone, St. Paul, pump, well, etc., at Vadnais Lake.....	1,687.10	1,687.10	
Sept. 24.	Pioneer Fuel Co., St. Paul, fuel.....	6,650.56	6,650.56	
Oct. 28.	John Martin Lumber Co., lumber....	77.46	77.46	
Nov. 13.	St. Paul Building Co., St. Paul, addition to pump house, Vadnais Lake..	457.94	457.94	
		\$20,504.28	\$20,090.99	\$413.29



TABLE NO. 7.

BOND ACCOUNT JANUARY 1, 1897

Date of Legislative Acts Authorizing Issue of Bonds.	Amount of Bonds Au- thorized.	Date of Bonds Issued.	When Due.	Amount of Bonds Issued.	Rate.	INTEREST PAYABLE.												Total Annual Interest.	
						Dec. 1.	Jan. 2.	Feb. 1.	Mar. 2.	April 1.	May 2.	June 1.	July 2.	Aug. 1.	Sept 1.	Oct. 1.	Nov. 2.		
Feb. 10, 1881	\$600,000	June 1, 1882	30 years	\$350,000	4 per cent	\$7,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	\$14,000
Jan. 26, 1883	500,000	Aug. 1, 1883	30 years	150,000	5 per cent	.....	.....	\$3,750	.....	.....	.....	.....	.....	\$3,750	.....	.....	.....	.....	7,500
Feb. 21, 1885	800,000	April 1, 1884	25 & 30 years	600,000	5 per cent	.....	.....	.....	.....	\$15,000	.....	.....	.....	.....	.....	\$15,000	.....	.....	30,000
Jan. 31, 1887	200,000	April 1, 1885	30 years	400,000	5 per cent	.....	.....	.....	.....	10,000	.....	.....	.....	.....	.....	.....	10,000	.....	20,000
Jan. 31, 1887	160,000	May 2, 1887	30 years	200,000	4½ per cent	.....	.....	.....	.....	.....	\$4,500	.....	.....	.....	.....	.....	.....	\$4,500	9,000
Mar. 29, 1889	300,000	Mar. 1, 1888	30 years	300,000	4½ per cent	.....	.....	.....	\$6,750	.....	.....	.....	.....	\$6,750	.....	.....	.....	.....	13,500
		Jan. 1, 1889	30 years	100,000	4½ per cent	.....	\$2,250	.....	.....	.....	.....	.....	\$2,250	.....	.....	.....	.....	.....	4,500
		Jan. 2, 1889	30 years	100,000	4½ per cent	.....	3,600	.....	.....	.....	.....	.....	3,600	.....	.....	.....	.....	.....	7,200
		May 1, 1889	30 years	100,000	4½ per cent	.....	.....	.....	.....	.....	2,250	.....	.....	.....	.....	.....	.....	2,250	4,500
		May 1, 1890	30 years	100,000	4 per cent	.....	.....	.....	.....	.....	2,000	.....	.....	.....	.....	.....	.....	2,000	4,000
	2,560,000			\$2,460,000		\$7,000	\$5,850	\$3,750	\$6,750	\$25,000	\$8,750	\$7,000	\$5,850	\$3,750	\$6,750	\$25,000	\$8,750	\$114,200	

TABLE NO. 8.

## STATEMENT SHOWING AMOUNT DUE THE BOARD OF WATER COMMISSIONERS ON DEC. 31, 1896, FROM CITY OF ST. PAUL.

Water for fire purposes from Dec. 1, 1891, to June 1, 1892.....	\$28,401.53	
Water for fire purposes from June 1, 1892, to Dec. 1, 1892.....	29,229.79	
Water for fire purposes from Dec. 1, 1892, to June 1, 1893.....	30,546.89	
Water for fire purposes from June 1, 1893, to Dec. 1, 1893.....	31,607.77	
Water for fire purposes from Dec. 1, 1893, to June 1, 1894.....	31,773.12	
Water for fire purposes from June 1, 1894, to Dec. 1, 1894.....	32,307.00	
Water for fire purposes from Dec. 1, 1894, to June 1, 1895.....	32,700.16	
Water for fire purposes from June 1, 1895, to Dec. 1, 1895.....	33,204.95	
Water for fire purposes from Dec. 1, 1895, to June 1, 1896.....	33,341.84	
Water for fire purposes from June 1, 1896, to Dec. 1, 1896.....	33,509.57	
	<hr/>	\$316,662.62
Premiums received and retained by city on the \$160,000 of bonds issued in January, 1889, to redeem the bonds of the old St. Paul Water Co. of like amount assumed by the city at the time of the purchase of the works.....		5,393.77
Relaying of water mains caused by change of grade—		
On Mt. Airy between Valley and Warren .....	\$248.12	
On Fairview between Jackson and Mt. Airy .....	134.25	
On East Sixth between Maria and Hoffman .....	399.75	
On East Sixth between Broadway and Olive .....	674.37	
On Flandrau at Harvester.....	65.00	
Changing main at Como bridge.....	760.58	
	<hr/>	2,282.07
Amount due for hydrant stream.....	\$27.50	
Balance .....	1894	\$340.00
For water for park fountains		
all .....	1895	815.00
For water for park fountains		
all .....	1896	855.00
For water for drinking fountains all .....	1896	312.50
	<hr/>	2,322.50
		2,350.00
Repairing water mains broken by sewer contractors. (Claims filed with city comptroller).....		\$326,648.46
Balance frontage tax assessment for 1884-5-6-7-8-9 .....		114.14
Balance frontage tax assessment for 1890 .....	\$1,446.28	
Balance frontage tax assessment for 1891 .....	2,196.01	
Balance frontage tax assessment for 1892 .....	1,723.68	
Balance frontage tax assessment for 1893 .....	1,283.35	
Balance frontage tax assessment for 1894 .....	816.19	
Balance frontage tax assessment for 1894 .....	8,301.72	
Balance frontage tax assessment for 1895 .....	31,372.51	
Balance frontage tax assessment for 1896 .....	114,925.17	
	<hr/>	\$162,164.91
From builders.....		150.00
From service connections.....		400.00
Street sprinkling, 1896.....		15,375.13
Ramsey county.....		237.00
	<hr/>	178,327.04
Total .....		\$505,089.64

TABLE NO. 11.  
FRONTAGE TAX ACCOUNT COLLECTIONS—BALANCE DUE JAN. 1, 1897.

RECEIPTS FOR YEARS.	1889 and Previous.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	Total.
March 17, 1896.....	\$9.56	\$28.86	\$109.53	\$421.72	\$515.19	\$10,981.65	\$2,368.83	.....	\$14,435.28
August 1, 1896.....	14.20	3.61	76.93	310.60	219.29	14,927.42	88,395.08	.....	103,947.13
November 1, 1896.....	.....	.....	43.66	187.32	147.31	1,173.94	3,237.84	.....	4,790.07
Total receipts.....	23.76	32.47	230.12	919.64	881.79	27,083.01	94,001.75	.....	123,172.48
Amount due Dec. 1, 1895, as per last report .....	1,469.98	2,228.48	1,953.80	2,202.99	1,697.98	35,384.73	125,374.26	.....	170,312.22
Amount of 1896 assessment collectible in 1897 .....	.....	.....	.....	.....	.....	.....	.....	114,925.17	47,139.74
Amount due Jan. 1, 1897.....	\$1,446.28	\$2,196.01	\$1,723.68	\$1,283.55	\$816.19	\$8,301.72	\$31,372.51	\$114,925.17	\$162,164.91

TABLE NO. 12.

## SINKING FUND INVESTMENT IN CITY TAX LEVY CERTIFICATES.

Date of Investment.	Date of Certificates.	When Due.	Certificate Numbers.	No. of Cert.	Interest.	Amount of Certificates.
Jan. 27, 1896	Jan. 15, 1896	June 15, 1897	1 to 291 inclusive	291	4%	\$145,500.00
May 25, 1896	Jan. 15, 1896	June 15, 1897	461 to 466 inclusive	6	4%	3,000.00
May 25, 1896	Feb. 15, 1896	June 15, 1897	622 to 675 inclusive	54	4%	27,000.00
May 25, 1896	April 15, 1896	June 15, 1897	1068 to 1185 inclusive	118	4%	59,000.00
July 15, 1896	July 15, 1896	July 15, 1897	1636 to 1858 inclusive	223	5%	111,500.00
July 22, 1896	July 15, 1896	July 15, 1897	1909 to 1914 inclusive	6	5%	3,000.00
Oct. 14, 1896	June 15, 1896	July 15, 1897	1514 to 1542 inclusive	29	4%	14,500.00
						\$363,500.00
Amount	uninvested.. ..					\$2,090.71

TABLE NO. 13.

Pay roll for year includes salaries of officers, engineers, firemen, inspectors and laborers.

## SALARIES OF ENGINEERS, FIREMEN AND KEEPERS AT THE VARIOUS STATIONS.

MONTH.	Number of Men.	Total Amount of Pay Roll.	McCarroll Lake Station.	Vadnais Lake Station.	Baldwin Lake Station.	West St. Paul Station.	Reservoir.	Total.
1895.								
November .....	96	\$4,114.58	\$300.00	\$94.98	\$165.00	\$110.00	\$25.00	\$694.98
December .....	74	3,538.94	300.00	50.00	165.00	110.00	25.00	650.00
1896.								
January .....	57	2,901.30	300.00	95.00	58.70	110.00	25.00	588.70
February .....	50	2,632.43	255.00	95.00	50.00	110.00	25.00	535.00
March .....	63	3,064.10	255.00	138.50	50.00	110.00	25.00	578.50
April .....	65	3,112.16	255.00	110.00	50.00	110.00	40.00	565.00
May .....	95	4,316.17	300.00	50.00	154.50	110.00	40.00	654.50
June .....	113	4,467.95	282.00	50.00	165.00	110.00	40.00	647.00
July .....	103	4,349.36	300.00	68.00	165.00	110.00	40.00	683.00
August .....	90	4,869.61	300.00	110.00	165.00	110.00	40.00	725.00
September .....	98	4,233.18	300.00	110.00	165.00	110.00	40.00	725.00
October .....	118	4,732.21	300.00	110.00	165.00	110.00	40.00	725.00
November .....	111	4,078.14	300.00	66.00	46.50	110.00	25.00	547.50
Totals .....	1,133	\$50,440.13	\$3,747.00	\$1,147.48	\$1,564.70	\$1,430.00	\$430.00	\$8,313.18

TABLE NO. 14.

THE FOLLOWING TABLE SHOWS THE NUMBER OF APPLICATIONS MADE FOR WATER SERVICES ANNUALLY FROM 1869 TO DATE.

YEAR.	High Service.	Low Service.	Total.
1869	.....	34	.....
1870	.....	321	.....
1871	.....	250	.....
1872	.....	164	.....
1873	.....	131	.....
1874	.....	153	.....
1875	.....	95	.....
1876	.....	85	2,426
1877	.....	65	.....
1878	.....	50	.....
1879	.....	180	.....
1880	.....	167	.....
1881	.....	164	.....
1882	.....	264	.....
1883	.....	301	.....
1884	164	336	500
1885	644	365	1,009
1886	639	369	1,008
1887	747	325	1,072
1888	812	403	1,218
1889	1,327	491	1,818
1890	1,071	336	1,407
1891	811	264	1,075
1892	671	210	881
1893	474	151	625
1894	363	139	502
1895	390	311	701
1896	384	156	540
	8,497	6,285	14,782

TABLE NO. 15.

## PUMPING PLANTS.

EXPENSE MAINTAINING THE FOUR (4) PUMPING STATIONS AND RESERVOIR.

STATION.	Salaries.	Fuel.	Waste and Machine Oil.	Repairs.	Kerosene Oil.	Total.
McCarron Lake station.....	\$3,747.00	\$5,963.64	\$292.40	\$305.74	.....	\$10,308.78
Baldwin Lake station.....	1,564.70	1,697.88	17.88	14.40	\$15.93	3,310.79
Vadnais Lake station.....	1,147.48	1,618.77	44.22	38.76	32.52	2,881.75
West St. Paul station.....	1,430.00	529.88	4.58	33.37	12.00	2,009.83
Reservoir .....	430.00	.....	.....	.....	.....	430.00
	\$8,319.18	\$9,810.17	\$359.08	\$392.27	\$60.45	\$18,941.15

TABLE NO. 16.

METERS IN SERVICE JAN. 1, 1897.

KIND OF METER.	SIZE.								Total.
	½	⅝	¾	1	1½	2	3	4	
Worthington (Improved) .....	106	111	33	41	7	4	2		304
Worthington (old style) .....	7	16	7	8	2				40
Union (rotary) .....	87	22	13	8		1	3		134
Union (piston) .....		1	1						2
Nash .....	10	2							12
Crown .....	70	18	28	33	10	1	2		162
Crown, "A A" .....	478		9	3					490
Empire .....	14	20	48	32	9		1		124
Empire, "A" .....		6	3	1					10
Empire, "A A" .....									
Gem .....							1	1	2
Thomson .....	19	6	2						27
Thomson, "B" .....	1	50	14	4	2	1			72
Hersey .....	34	38	30	24	11	2			139
Hersey disc .....	3			1			1		5
Frost .....		1							1
Trident .....	8	2	1						11
Westinghouse .....	3		6	1	1				11
Totals .....	15	901	282	167	121	41	10	9	1,546

TABLE NO. 17.

Shut off and turning on water from Dec. 1, 1895, to Jan. 1, 1897.

	High Service	Low Service	Total.
Shut off for repairs .....	281	284	565
Shut off for non-payment .....	260	175	435
Shut off for vacant premises .....	530	436	966
Total .....	1,071	895	1,966
Turned on old services .....	1,059	866	1,925
Turned on new services .....	349	119	468
Turned on for builders .....	4	10	14
Total .....	1,412	995	2,407

Total services shut off and turned on for year ending:

December 1, 1884 .....	1,014	December 1, 1891 .....	4,743
December 1, 1885 .....	2,311	December 1, 1892 .....	4,470
December 1, 1886 .....	2,384	December 1, 1893 .....	4,477
December 1, 1887 .....	2,541	December 1, 1894 .....	4,932
December 1, 1888 .....	2,833	December 1, 1895 .....	4,696
December 1, 1889 .....	3,978	December 31, 1896 .....	4,373
December 1, 1890 .....	3,919		



TABLE NO. 18.

SHOWING THE DIFFERENT KINDS AND SIZES OF METERS BELONGING TO THE CITY AND PRIVATE PARTIES IN SERVICE AND ON HAND DEC. 31, 1896.

KIND OF METERS.	Size in Inches.	Property of City.			Private Property.			Grand Total of Meters in Service.	Grand Total of Meters in Shop.	Grand Total of All Meters.
		In Service.	At Work Shop.	Total.	In Service.	At Work Shop.	Total.			
Worthington improved.....	4	.....	.....	.....	2	.....	2	2	.....	2
Worthington improved.....	3	.....	.....	.....	4	.....	4	4	.....	4
Worthington improved.....	2	.....	.....	.....	5	.....	5	7	.....	7
Worthington improved.....	1½	34	2	36	5	.....	5	39	2	41
Worthington improved.....	1	31	.....	31	2	.....	2	33	.....	33
Worthington improved.....	¾	105	3	108	3	.....	3	108	3	111
Worthington improved.....	⅝	84	4	88	17	1	18	101	5	106
Worthington old style.....	3	.....	3	3	.....	.....	.....	.....	3	3
Worthington old style.....	2	.....	.....	.....	.....	.....	.....	2	.....	2
Worthington old style.....	1½	8	.....	8	.....	.....	.....	8	.....	8
Worthington old style.....	1	6	.....	6	1	.....	1	7	.....	7
Worthington old style.....	¾	15	1	16	.....	.....	.....	15	1	16
Worthington old style.....	⅝	7	.....	7	.....	.....	.....	7	.....	7
Union rotary.....	4	3	.....	3	.....	.....	.....	3	.....	3
Union rotary.....	3	1	.....	1	.....	.....	.....	1	.....	1
Union rotary.....	2	.....	2	2	.....	.....	.....	.....	2	2
Union rotary.....	1½	7	.....	7	1	.....	1	8	.....	8
Union rotary.....	1	12	1	13	.....	.....	.....	12	1	13
Union rotary.....	¾	22	.....	22	.....	.....	.....	22	.....	22
Union rotary.....	⅝	87	.....	87	.....	.....	.....	87	.....	87
Union piston.....	1	1	.....	1	.....	.....	.....	1	.....	1
Union piston.....	¾	1	.....	1	.....	.....	.....	1	.....	1
Nash.....	¾	2	.....	2	.....	.....	.....	2	.....	2
Nash.....	⅝	9	1	10	.....	.....	.....	9	1	10
Crown.....	4	1	.....	1	1	.....	1	2	.....	2
Crown.....	3	1	.....	1	.....	.....	.....	1	.....	1
Crown.....	2	.....	.....	.....	9	1	1	10	.....	10
Crown.....	1½	33	.....	33	.....	.....	.....	33	.....	33
Crown.....	1	28	.....	28	.....	.....	.....	28	.....	28
Crown.....	¾	16	2	18	.....	.....	.....	16	2	18
Crown.....	⅝	65	4	69	1	.....	1	66	4	70
Crown.....	⅝	.....	1	1	.....	.....	.....	.....	1	1
Crown "A A".....	1½	3	.....	3	.....	.....	.....	3	.....	3
Crown "A A".....	1	9	2	11	.....	.....	.....	9	2	11
Crown "A A".....	⅝	464	59	523	.....	.....	.....	464	59	523
Empire.....	4	1	.....	1	.....	.....	.....	1	.....	1
Empire.....	2	9	2	11	.....	.....	.....	9	2	11
Empire.....	1	27	5	32	.....	.....	.....	27	5	32
Empire.....	¾	47	1	48	.....	.....	.....	47	1	48
Empire.....	⅝	19	1	20	.....	.....	.....	19	1	20
Empire.....	1½	14	.....	14	.....	.....	.....	14	.....	14
Empire "A".....	1	1	.....	1	.....	.....	.....	1	.....	1
Empire "A".....	¾	1	2	3	.....	.....	.....	1	2	3
Empire "A".....	⅝	6	.....	6	.....	.....	.....	6	.....	6
Empire "A A".....	⅝	.....	1	1	.....	.....	.....	.....	1	1
Gem.....	4	.....	.....	.....	1	.....	1	1	.....	1
Gem.....	3	.....	1	1	1	.....	1	1	1	2
Thomson.....	1	2	.....	2	.....	.....	.....	2	.....	2
Thomson.....	¾	5	1	6	.....	.....	.....	5	1	6
Thomson.....	⅝	19	.....	19	.....	.....	.....	19	.....	19
Thomson "B".....	2	1	1	2	.....	.....	.....	1	1	2
Thomson "B".....	1½	2	.....	2	.....	.....	.....	2	.....	2
Thomson "B".....	1	3	1	4	.....	.....	.....	3	1	4
Thomson "B".....	¾	11	3	14	.....	.....	.....	11	3	14
Thomson "B".....	⅝	49	1	50	.....	.....	.....	49	1	50



TABLE NO. 18.—Continued.

SIZE OF METERS—Continued.

KIND OF METERS.	Size in Inches.	Property of City.			Private Property.			Grand Total of Meters in Service.	Grand Total of Meters in Shop.	Grand Total of All Meters.
		In Service.	At Work Shop.	Total.	In Service.	At Work Shop.	Total.			
Thomson "B" .....	1/2	1	...	1	...	...	...	1	...	1
Hersey .....	3	12	...	12	...	...	...	12	...	12
Hersey .....	2	9	4	13	...	...	...	9	4	13
Hersey .....	1 1/2	24	...	24	...	...	...	24	...	24
Hersey .....	1	30	...	30	...	...	...	30	...	30
Hersey .....	3/4	36	2	38	...	...	...	36	2	38
Hersey .....	5/8	33	1	34	...	...	...	33	1	34
Hersey Disc. ....	2	1	...	1	...	...	...	1	...	1
Hersey Disc. ....	1 1/2	1	...	1	...	...	...	1	...	1
Hersey Disc. ....	5/8	3	...	3	...	...	...	3	...	3
Frost .....	3/4	1	...	1	...	...	...	1	...	1
Sport .....	5/8	...	1	1	...	...	...	...	1	1
Trident .....	1	1	...	1	...	...	...	1	...	1
Trident .....	3/4	2	...	2	...	...	...	2	...	2
Trident .....	5/8	8	...	8	...	...	...	8	...	8
Westinghouse .....	2	1	...	1	...	...	...	1	...	1
Westinghouse .....	1 1/2	1	...	1	...	...	...	1	...	1
Westinghouse .....	1	6	...	6	...	...	...	6	...	6
Westinghouse .....	7/8	3	1	4	...	...	...	3	1	4
		1,448	114	1,562	45	1	46	1,493	115	1,608

TABLE NO. 19.  
EXPENSE FOR MAINTAINING PUMPING STATIONS AND RESERVOIR FOR YEARS 1891-2-3-4-5 and 6.  
McCARRON LAKE STATION.

Year.	Salaries.	Fuel.	Machine Oil and Waste.	Repairs and Supplies.	Kerosene Oil.	Total.	WATER PUMPED.		FUEL, COAL, ETC.		Daily Increase in Pumping, Gallons.
							Annually.	Daily.	Annually.	Daily.	
1891.....	\$3,540.00	\$4,702.12	\$213.86	\$230.66	\$38.50	\$8,725.14	1,106,034,800	3,030,232	2,134,000	5845	871,090
1892.....	3,575.00	5,400.89	302.36	37.82	36.75	9,352.82	1,071,130,320	2,934,603	2,036,734	5580	.....
1893.....	3,593.00	5,413.30	279.56	329.46	Electric.	9,615.32	1,298,551,200	3,557,674	2,147,888	5884	623,070
1894.....	3,706.50	5,012.85	237.99	351.12	5.20	9,313.66	1,300,813,800	3,882,110	2,345,731	6427	326,000
1895.....	3,652.00	5,034.79	243.57	269.09	5.20	9,204.65	1,536,912,600	4,210,719	2,536,020	6948	338,609
1896 (13 mos.).	3,747.00	5,963.64	292.40	305.74	.....	10,308.78	1,651,524,200	4,160,011	2,751,698	6915	*50,708

\*Decrease.

## BALDWIN LAKE STATION.

Year.	Salaries.	Fuel.	Machine Oil and Waste.	Repairs and Supplies.	Kerosene Oil.	Total.	WATER PUMPED.		FUEL, COAL, ETC.		Daily Increase in Pumping, Gallons.
							Annually.	Daily.	Annually.	Daily.	
1891.....	\$1,507.16	\$4,998.44	\$51.98	\$77.39	\$22.14	\$6,657.11	1,983,034,500	8,077,535	{ Coal 150,325 } { Wood 79 3/4 }	.....	.....
1892.....	1,062.08	941.00	56.28	56.12	11.90	2,127.39	1,153,794,000	9,470,266	" 576	.....	.....
1893.....	1,145.66	778.42	45.18	363.99	10.35	2,343.60	1,104,158,600	9,219,623	" 461 3/4	.....	.....
1894.....	1,245.66	1,182.05	49.80	251.63	10.30	2,739.44	1,449,360,900	9,662,406	" 666 1/2	4 1/2	.....
1895.....	1,450.00	2,524.46	23.77	45.19	27.08	4,070.50	1,914,949,800	8,824,653	" 821	4	.....
1896 (13 mos.).	1,564.70	1,697.88	17.88	14.40	15.93	3,310.79	1,917,058,000	9,271,715	" 841 3/4	4.3	.....

## PUMPING STATIONS AND RESERVOIR—Continued.

## VADNAIS LAKE STATION.

Year.	Salaries.	Fuel.	Machine Oil and Waste.	Repairs and Supplies.	Kerosene Oil.	Total.	WATER PUMPED.		FUEL, COAL, ETC.	
							Annually.	Daily.	Annually.	Daily.
1891.....	\$1,100.00	\$1,081.68	\$50.75	\$197.12	\$6.36	\$2,435.91	207,750,000	.....	246,800	.....
1892.....	1,020.00	1,905.25	73.71	102.19	25.90	3,127.05	.....	.....	.....	.....
1893.....	600.00	.....	.....	21.35	.....	3,621.35	.....	.....	.....	.....
1894.....	912.50	1,508.99	21.06	216.73	20.60	2,679.90	337,100,000	.....	624,387	.....
1895.....	848.33	1,105.00	47.50	31.58	11.64	2,044.03	237,013,000	.....	550,000	.....
1896 (13 mos.)	1,147.48	1,618.77	44.22	38.76	32.52	2,881.75	938,611,850	2,364,202	612,614	.....

## WEST ST. PAUL STATION.

Year.	Salaries.	Fuel.	Machine Oil and Waste.	Repairs and Supplies.	Kerosene Oil.	Total.	WATER PUMPED.		FUEL, COAL, ETC.	
							Annually.	Daily.	Annually.	Daily.
1893.....	\$1,237.75	\$589.63	\$29.72	\$23.50	\$15.10	\$1,895.70	10,015,722	27,440	209,043	571
1894.....	1,320.00	328.96	2.88	28.83	14.20	1,694.87	9,123,480	24,990	169,226	463
1895.....	1,320.00	299.50	5.27	26.47	9.08	1,660.32	10,520,640	28,848	174,600	479
1896 (13 mos.)	1,430.00	529.88	4.58	33.37	12.00	2,009.83	13,497,120	33,998	212,200	535

## RESERVOIR.

Year.	Salaries.	Year.	Salaries.
1891.....	\$405.00	1894.....	\$405.00
1892.....	405.00	1895.....	405.00
1893.....	405.00	1896 (13 months).....	430.00

1891.....	\$405.00	1894.....	\$405.00
1892.....	405.00	1895.....	405.00
1893.....	405.00	1896 (13 months).....	430.00

TABLE NO. 20.

COMPARATIVE STATEMENT OF HOSE VIOLATIONS FOR 1894-5 AND 1896.

VIOLATION.	1894.			1895.			1896.		
	High.	Low.	Total.	High.	Low.	Total.	High.	Low.	Total.
Hose, 1 violation.....	200	129	329	136	87	223	155	46	201
Hose, 2 violations.....	28	16	44	5	1	6	10	3	13
Hose, 3 violations.....	13	7	20	1	.....	1	1	1	2
Hose, 4 violations.....	2	3	5	.....	.....	.....	.....	.....	.....
Hose, 5 violations.....	1	2	3	.....	.....	.....	.....	.....	.....
Hose, 7 violations.....	2	1	3	.....	.....	.....	.....	.....	.....
Reel, 6 to 9 p. m., 1 violation....	185	50	235	34	.....	34	61	4	65
Reel, 6 to 9 p. m., 2 violations...	22	14	36	6	.....	6	1	.....	1
Reel, 6 to 9 p. m., 3 violations...	6	2	8	2	.....	2	1	.....	1
Reel, 6 to 9 p. m., 4 violations...	2	1	3	2	.....	2	.....	.....	.....
Reel, 6 to 9 p. m., 7 violations...	.....	1	1	.....	.....	.....	.....	.....	.....
Hose all day, 1 violation.....	162	34	196	1	.....	1	40	3	43
Hose all day, 2 violations.....	23	9	32	1	.....	1	.....	.....	.....
Hose all day, 3 violations.....	2	4	6	.....	.....	.....	.....	.....	.....
Hose all day, 4 violations.....	.....	1	1	.....	.....	.....	.....	.....	.....
Totals .....	648	274	922	188	88	276	269	57	326

TABLE NO. 21.

STATEMENT SHOWING THE NUMBER OF MILES OF PIPE LAID ANNUALLY TO DATE, EXPENSE OF SAME, FRONT-AGE TAX, ETC.

	MAINS LAID.		Expenditure on Account of Laying mains.	Construction Outside of City.	Annual Maintenance	Number of Applications for Taps.	Annual Receipts from Consumers.	Increase.	Frontage Tax Receipts.	Number of fire Hydrants in Use.	Frontage Tax Assessment.	Years Frontage Tax Has Been Paid Incl. 1894	Years more to Pay on Basis of 10 Years.
	Miles	Feet.											
To Aug. 10, 1882.....	231.662												
From Aug. 10, '82, to Dec. 1, '82.....	3.793		a \$12,309.44	\$1,566.80	\$1,674.58	2,007				188			
From Dec. 1, '82, to Dec. 1, '83.....	4.807		61,003.97	100,021.19	6,554.30	118				198			
From Dec. 1, '83, to Dec. 1, '84.....	161.220		157,189.31	509,686.93	11,473.84	301				236	\$12,852.76	11	
From Dec. 1, '84, to Dec. 1, '85.....	23.2583		207,586.90	40,148.36	19,275.58	500			\$12,269.90	315	20,590.06	9	
From Dec. 1, '85, to Dec. 1, '86.....	183.354		138,694.54	19,657.46	17,976.64	1,009			19,538.26	673	33,787.68	8	
From Dec. 1, '86, to Dec. 1, '87.....	20.2207		225,443.70	32,975.47	22,806.58	1,008			32,495.91	808	46,358.88	3	
From Dec. 1, '87, to Dec. 1, '88.....	283.392		288,018.19	97,736.31	23,799.81	1,072		\$12,976.71	43,062.60	1,134	58,609.10	6	
From Dec. 1, '88, to Dec. 1, '89.....	354.963		237,680.58	80,690.69	23,122.69	1,215		6,084.18	55,066.01	1,471	76,706.21	5	
From Dec. 1, '89, to Dec. 1, '90.....	264.085		211,013.64	26,036.29	38,473.82	1,818		12,200.89	73,079.70	1,748	99,680.96	4	
From Dec. 1, '90, to Dec. 1, '91.....	55.696		e 118,343.20	38,337.07	38,473.82	1,407		20,648.48	88,987.80	1,813	117,947.95	3	
From Dec. 1, '91, to Dec. 1, '92.....	14.928		63,325.15	41,327.25	33,349.12	881		11,693.40	112,082.57	1,968	123,886.45	2	
From Dec. 1, '92, to Dec. 1, '93.....	81.946		42,287.17	4,639.46	36,404.84	625		6,439.62	107,890.11	2,067	135,336.46	1	
From Dec. 1, '93, to Dec. 1, '94.....	6.646		f 81,360.58	6,138.62	39,139.72	502		1,372.11	112,115.05	2,131	143,001.73		
From Dec. 1, '94, to Dec. 1, '95.....	8.13		h 64,925.63	24,624.65	39,006.14	701		279.20	147,171.40	2,200	125,374.26		
From Dec. 1, '95, to Dec. 31, '96.....	33.185			113,564.23	g 41,800.24	540	g 190,714.78	g 11,468.26	123,172.48	2,232	114,925.17		
Relaid in 1896, 1,508 feet.....	245	220	\$1,993,202.09	\$1,240,749.78	\$396,240.65	14,782			\$936,940.79				
Less relaid and mains abandoned.....	7	3,212							*2,551.77				
Net amount mains.....	237	2,288							\$934,389.02				

a This includes relaying 16-inch pipe on Lafayette avenue near Trout Brook, of regrading street, an expense of \$4,677.97.

b Pumping station established for high service in fall of 1884.

c Pumping stations established for well plant at Vadnais lake, also Rice lakes.

d Pumping station established for high service in West St. Paul in fall of 1892.

e This includes laying the 20-inch force main to reservoir.

f This includes laying 9,234 feet of 30-inch supply main on Dale street from reservoir to Dale and Front, at an expense of \$38,305.78.

g This is for a period of 13 months.

h This includes laying 7,680 feet of 36-inch castiron force main from McCarron lake pumping station to high service reservoir, at an expense of \$49,347.64.

\*Amount refunded.

## LIST OF VOUCHERS PAID FROM DEC. 1, 1895, TO DEC. 31, 1896.

DECEMBER, 1895.

No. of Voucher.	NAME.	CLAIM.	Amount.
7653	Jno. Wagener, city treasurer.....	Payroll for November, 1895..	\$4,114.58
7654	Jno. Wagener, city treasurer.....	Interest due Dec. 1, 1895.....	7,000.00
7655	A. D. Smith Co.....	Sawing planks.....	1.50
7656	Henry E. Wedelstaedt.....	Stationery.....	3.35
7657	Goodyear Rubber Co.....	Hose, packing, etc.....	15.28
7658	The Western Supply Co.....	Lead pipe, couplings, etc.....	18.35
7659	Noyes Bros. & Cutler.....	D. S. Lt. and putty.....	1.36
7660	T. L. Blood & Co.....	Lit. and putty.....	.48
7661	Nicols & Dean.....	Washers.....	.60
7662	The Crane-Ordway Co.....	Pipe couplings, etc.....	4.07
7663	Farwell, Ozmun, Kirk & Co.....	Powder, nails, etc.....	6.80
7664	Robinson, Cary & Co.....	Pipe couplings, etc.....	78.30
7665	Brown-Treacy Co.....	Stationery.....	3.05
7666	Cornplanter Oil Co.....	Gasoline.....	1.95
7667	Tierney & Co.....	Bran.....	1.40
7668	D. T. De Wolf.....	Hay.....	10.39
7669	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
7670	P. H. Kelly Mercantile Co.....	Oil, etc.....	26.90
7671	Franklin Machine Works.....	Machine work.....	1.00
7672	The N. W. Telephone Ex. Co.....	Rent of telephones.....	7.25
7673	Allen & Co.....	Livery.....	15.50
7674	Chas. Friend & Son.....	Leather.....	2.50
7675	J. G. Duggan.....	Sharpening tools, etc.....	4.65
7676	A. Decker & Co.....	Wire, nails, etc.....	1.80
7677	St. Paul Timber and Supply Co.....	Filing.....	173.10
7678	P. N. Lindquist.....	Horseshoeing.....	10.50
7679	Jno. Martin Lumber Co.....	Est. No. 2 and final lumber.....	77.46
7680	Jno. Martin Lumber Co.....	Lumber.....	18.86
7681	Thos. Fitzpatrick.....	Carpenter work, etc.....	20.05
7682	Lauer Bros.....	Stone sill.....	1.50
7683	Fielding & Shepley.....	Repairing paving.....	139.71
7684	Neptune Meter Co.....	Meters and couplings.....	80.62
7685	Union Water Meter Co.....	Meters.....	204.00
7686	Odgen, Merrill & Greer.....	Lampwicks.....	.33
7687	A. S. Washburn.....	Electric light.....	15.00
7688	Geo. J. Mitsch & Co.....	Supplies.....	3.95
7689	Dan Cashill & Co.....	Horseshoeing.....	2.00
7690	D. L. Bell.....	Cement.....	4.20
7691	Mitsch Wagon and Carriage Co.....	Sharpening tools.....	10.30
7692	Prendergast Bros.....	Galvanized tank, etc.....	37.75
7693	Pioneer Press Co.....	Ruled paper.....	4.50
7694	The Dispatch Printing Co.....	Advertising.....	3.06
7695	Theodore Vandlac.....	Est. No. 5, hauling coal, Vad- nais lake.....	11.62
7696	Wedelstaedt & Carmen.....	Postals and envelopes.....	9.50
7697	Million & Young.....	Est. No. 7, pipe laying.....	353.73
7698	Patrick Doherty.....	Est. No. 4, pipe laying.....	175.93
7699	Ransom Subway Co.....	Est. No. 3, conduit, etc., at Otter lake.....	2,652.00
Total .....			\$15,355.73



## LIST OF VOUCHERS—Continued.

JANUARY, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
7700	Jno. Wagener, city treasurer.....	Payroll for December, 1895...	\$3,568.94
7701	Jno. Wagener, city treasurer.....	Interest due Jan. 1, 1896.....	5,850.00
7702	Jno. Wagener, city treasurer.....	Interest due Feb. 1, 1896.....	3,750.00
7703	Pioneer Fuel Co.....	Est. No. 4, fuel.....	321.75
7704	St. Paul Fire and Marine Ins. Co..	Insurance on shop, barn, etc..	21.80
7705	Smith & Farwell.....	Bookcase .....	16.00
7706	De Cou & Co.....	Netting .....	.50
7707	National Meter Co.....	Meters, etc.....	165.00
7708	Union Brass and Metal Mfg. Co..	Stopcocks .....	20.40
7709	Jno. G. Duggan.....	Sharpening tools, etc.....	10.90
7710	D. L. Bell.....	Cement .....	14.30
7711	Farwell, Ozmun, Kirk & Co.....	Hardware, etc.....	5.18
7712	H. C. Boyeson & Co.....	Stationery .....	10.80
7713	The Dispatch Printing Co.....	Advertising .....	1.36
7714	Daily Globe.....	Advertising .....	8.00
7715	Brown-Treacy & Co.....	Stationery .....	8.14
7716	P. N. Lindquist.....	Horseshoeing .....	10.25
7717	N. W. Shot and Lead Works.....	Lead pipe.....	33.66
7718	Franklin Machine Works.....	Machine work.....	1.00
7719	Pioneer Press Co.....	Blank books, etc.....	30.25
7720	P. H. Kelly Mercantile Co.....	Oil, etc.....	46.30
7721	Prendergast Bros.....	Chandelier globes, etc.....	1.50
7722	Myers & Co.....	Clock .....	4.75
7723	Adam Decker & Co.....	Hardware .....	6.85
7724	Chas. Friend & Son.....	Leather, etc.....	2.40
7725	Boeringer & Son.....	Drawing ink.....	.50
7726	St. Paul Furniture Co.....	Oak rollers, etc.....	1.60
7727	T. L. Blood & Co.....	Paint .....	.30
7728	Theophile Vandlac.....	Est. No. 6, hauling coal, Vad- nais Lake.....	11.02
7729	Allen & Co.....	Livery .....	14.00
7730	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
7731	Fielding & Shepley.....	Repairing paving.....	11.10
7732	Odgen, Merrill & Greer.....	Lamps, etc.....	10.21
7733	Jameson, Hevener & Co.....	Feed .....	33.64
7734	Wedelstaedt & Carmen.....	Printing postals.....	3.00
7735	H. M. Smyth Printing Co.....	Envelopes .....	5.00
7736	Nicols & Dean.....	Bolts, etc.....	1.01
7737	The Western Supply Co.....	Plugs .....	.47
7738	The Pioneer Press Co.....	Advertising .....	13.50
7739	Smith & Farwell Co.....	Desk and chairs.....	16.00
7740	The Crane & Orway Co.....	Galvanized pipe, etc.....	25.00
7741	Robinson & Cary Co.....	Valves, etc.....	33.13
7742	Mitsch Wagon and Carriage Co..	Sharpening tools, etc.....	17.77
7743	The N. W. Telephone Ex. Co.....	Rent of telephones.....	7.25
7744	Ransome Subway Co.....	Est. No. 4, Otter Lake con- duit .....	960.50
7745	Million & Young.....	Est. No. 8, pipe laying.....	188.26
7746	Patrick Doherty.....	Est. No. 6, pipe laying.....	148.00
7747	Geo. J. Mitsch & Co.....	Supplies .....	5.35
7748	Boggs & Hoyt.....	Hay .....	69.65
7749	Dan'l Cashill.....	Horseshoeing .....	4.00
7750	St. Paul Building Co.....	Est. No. 1, engine house Vad- nais lake.....	387.00
7751	Chas. Stone.....	Est. No. 2, pumping wells, etc., Vadnais lake.....	1,280.00
7752	Jno. Caulfield, secretary.....	Postage, freight, etc.....	78.21
7753	Pioneer Fuel Co.....	Est. No. 5, fuel.....	1,361.02
7754	Mahle & Sutmar.....	Sharpening tools.....	.84
Total .....			\$18,622.16

## LIST OF VOUCHERS—Continued.

FEBRUARY, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
7755	Jno. Wagener, city treasurer.....	Payroll January, 1896.....	\$2,901.30
7756	Jno. Wagener, city treasurer.....	Interest due March 1, 1896....	6,750.00
7757	Rich & Clymer.....	Envelopes, etc.....	14.00
7758	Standard Oil Co.....	Oil.....	4.00
7759	C. Y. Coffey.....	Electric lights and repairs....	1.50
7760	St. Paul Building Co.....	Piles and blocking, Vadnais Lake.....	60.94
7761	National Meter Co.....	Est. No. 1, meters.....	300.00
7762	Hersey Mfg Co.....	Meters.....	42.25
7763	J. W. Cunningham & Co.....	Est. No. 1 and final, printing annual report.....	641.25
7764	Patrick Doherty.....	Est. No. 7, and final pipe laying, Dale street.....	101.89
7765	Million & Young.....	Est. No. 9, pipe laying.....	157.41
7766	N. W. Telephone Ex. Co.....	Rent of telephones.....	7.25
7767	J. G. Duggan.....	Repairing tools, etc.....	5.50
7768	Daily Globe.....	Advertising.....	1.00
7769	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
7770	P. N. Lindquist.....	Horseshoeing.....	6.00
7771	Wedelstaedt & Carmen.....	500 exchange slips.....	1.50
7772	H. C. Boyeson & Co.....	Stationery.....	10.45
7773	Brown, Treacy & Co.....	Frontage tax books.....	13.75
7774	Cornplanter Oil Co.....	Oil.....	18.29
7775	The Western Supply Co.....	Pipe and fittings.....	.61
7776	Robinson & Cary Co.....	Machine supplies, etc.....	10.90
7777	The Crane & Ordway Co.....	Supplies.....	4.68
7778	Farwell, Ozmun, Kirk & Co.....	Supplies.....	1.34
7779	St. Paul Lime and Cement Co.....	Cement.....	.40
7780	Jameson, Hevener & Co.....	Oats.....	35.53
7781	Allen & Co.....	Livery.....	19.00
7782	Mitsch Wagon and Carriage Co.....	Sharpening tools.....	16.97
7783	P. H. Kelly Mercantile Co.....	Candles, brooms, etc.....	14.65
7784	P. H. Kelly Mercantile Co.....	Est. No. 1, lubricating oils....	39.60
7785	D. L. Bell.....	Cement, etc.....	13.50
7786	Jno. Boehm.....	Wood for Baldwin Station....	31.50
7787	Jno. Stock.....	Wood.....	18.75
7788	Jno. Boehm.....	Wood.....	18.75
7789	Anton Heller.....	Wood.....	37.50
7790	A. Hoffman.....	Wood.....	30.00
7791	Jos. Kunsher, Jr.....	Wood.....	37.50
7792	Jno. Novak.....	Wood.....	37.50
7793	Wm. Molitor.....	Wood.....	37.50
7794	Frank Hoffman.....	Wood.....	37.50
7795	H. A. Gatzow.....	Wood.....	37.50
7796	Chas. Anderson.....	Wood.....	35.00
7797	Jno. Yost.....	Wood.....	30.00
7798	August Thou.....	Wood.....	37.50
7799	Michael Gross.....	Wood.....	30.00
7800	Jas. Grosskopf.....	Wood.....	30.00
7801	Chas. Kunshier.....	Wood.....	30.00
7802	Fred Wenzel.....	Wood.....	37.50
7803	Leon Dupree.....	Wood.....	37.50
7804	Yost Yost.....	Wood.....	30.00
7805	Jacob Molitor.....	Wood.....	37.50
7806	H. K. Wallan.....	Wood.....	37.50
7807	Hans Hanson.....	Wood.....	38.13
7808	Leon F. Dupree.....	Wood.....	32.50
7809	Jno. Hughes.....	Wood.....	30.00
7810	Frank Kraus.....	Wood.....	37.50
7811	Chas. Rehbein.....	Wood.....	37.50
7812	Albert Rehbein.....	Wood.....	37.50
7813	Phil F. Lamotte.....	Wood.....	30.00
7814	A. Totte.....	Wood.....	30.00
7815	Ambrose Brisitt.....	Wood.....	18.75
7816	Henry Dupree.....	Wood.....	37.50
7817	Theophile Vandlac.....	Est. No. 7, hauling coal, Vadnais lake.....	21.47
7818	The E. P. Allis Co.....	Est. No. 2, and final.....	3,784.00

## LIST OF VOUCHERS—Continued.

FEBRUARY, 1896—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
7819	J. F. McCarthy.....	Est. No. 14, final well at Centerville .....	1,400.00
7820	J. F. McCarthy.....	Taking pipe out of well, Vadnais Lake.....	10.00
7821	C. E. Green, register of deeds....	Making abstracts.....	28.13
7822	Distpatch Printing Co.....	Advertising .....	12.00
7823	Tierney & Co.....	Feed .....	.89
7824	Dan Cashill.....	Horseshoeing .....	1.00
7825	A. S. Washburn.....	Electric light.....	15.00
7826	Pioneer Fuel Co.....	Est. No. 6, fuel.....	258.64
7827	Kenny Bros.....	Boiler .....	130.00
7828	Jno. Caulfield, secretary.....	Cash advanced.....	62.93
7829	James Shiely.....	Drayage .....	9.23
Total .....		.....	\$17,979.63

## LIST OF VOUCHERS—Continued.

MARCH, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
7830	Jno. Wagener, city treasurer.....	Payroll February, 1896.....	\$2,632.43
7831	Andreas Frischman.....	Wood .....	37.50
7832	Jos. Arth.....	Wood .....	33.75
7833	Erick Larson.....	Wood .....	23.75
7834	A. N. Dyer.....	Wood .....	28.75
7835	Jas. Husick.....	Wood .....	37.50
7836	Frank McGlynn.....	Wood .....	18.75
7837	Sam'l L. Neal.....	Wood .....	37.50
7838	Peter Kammerer.....	Wood .....	37.50
7839	Fred Lenz.....	Wood .....	30.50
7840	F. A. Leander.....	Wood .....	38.13
7841	August Rehbein.....	Wood .....	37.50
7842	Jno. Flor.....	Wood .....	30.00
7843	Mike Flor.....	Wood .....	30.00
7844	H. Roger.....	Wood .....	37.50
7845	Jos. Lichtscheidl.....	Wood .....	37.50
7846	Bert Hughes.....	Wood .....	37.50
7847	J. G. Duggan.....	Repairing buggy, etc.....	75.75
7848	Pioneer Fuel Co.....	Est. No. 7, fuel.....	1,230.11
7849	Theophile Vandlac.....	Est. No. 8, hauling coal.....	34.70
7850	P. N. Lindquist.....	Horseshoeing .....	5.00
7851	Minnesota Engine Works.....	Repairing check valves.....	.45
7852	P. H. Kelly Mercantile Co.....	Candles .....	5.20
7853	Wedelstaedt & Carmen.....	Printing .....	5.95
7854	H. C. Boyeson & Co.....	Stationery .....	6.20
7855	Prendergast Bros.....	Stove wicks.....	.50
7856	Allen & Co.....	Livery .....	24.00
7857	Jno. Rogers, Jr., & Bros.....	Insurance .....	12.00
7858	Pioneer Press Co.....	Canvas cover for book.....	1.75
7859	N. W. Telephone Ex. Co.....	Rent of telephone.....	7.25
7860	Million & Young.....	Est. No. 10, pipe laying.....	110.48
7861	National Meter Co.....	Est. No. 2, meters.....	307.75
7862	Pittsburg Meter Co.....	Meters .....	234.40
7863	Crane-Ordway Co.....	Pipe fittings, etc.....	9.71
7864	N. W. Engineering Co.....	1 McCreary shade.....	1.25
7865	Geo. J. Mitsch & Co.....	Supplies .....	11.45
7866	D. L. Bell.....	Cement .....	4.20
7867	Fairbanks, Morse & Co.....	Testing scale.....	4.25
7868	Jno. Martin Lumber Co.....	Lumber .....	14.32
7869	Geo. Krawezak.....	Wood .....	37.50
7870	Dan Cashill.....	Horseshoeing .....	2.00
7871	Board of fire commissioners.....	Condemned hose.....	60.00
7872	Drs. McLaren and De Witt.....	Prof. services, And. Falk.....	14.00
7873	The Western Supply Co.....	Pipe fittings.....	.86
7874	Union Brass and Metal Mfg Co.....	Copper screw.....	1.75
7875	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
7876	Daily Globe.....	Advertising .....	1.56
7877	St. Paul Building Co.....	Est. No. 2 and final, pump house, Vadnais lake.....	10.00
7878	Boeringer & Son.....	Drawing ink.....	.50
7879	Mitsch Wagon and Carriage Co.....	Sharpening tools.....	8.76
7880	St. Paul Plow Co.....	Special castings.....	18.88
7881	Cornplanter Oil Co.....	Oil .....	6.24
7882	Robinson & Cary Co.....	Waste, etc.....	33.61
7883	Farwell, Ozmun, Kirk & Co.....	Shovels, etc.....	9.73
7884	National Meter Co.....	Est. No. 3, meters.....	303.00
7885	C. Neumann.....	Lunches .....	17.75
7886	Wedelstaedt & Carmen.....	Printing .....	7.50
7887	Chas. Stone.....	Est. No. 3, pump, well, etc., Vadnais Lake.....	107.10
7888	Jno. Caulfield, secretary.....	Cash advanced.....	53.17
7889	Jno. Wagener, city treasurer.....	Interest due April 1, 1896.....	25,000.00
7890	Jno. F. Hale.....	Wood .....	36.87
Total .....			\$31,028.51

## LIST OF VOUCHERS—Continued.

APRIL, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
7891	Clement Cardinal.....	Land for right of way.....	\$120.00
7892	David Capistrant.....	Land for right of way.....	240.00
7893	Jno. H. Sherman.....	Land for right of way.....	150.00
7894	Jno. Wagener, city treasurer.....	Payroll March, 1896.....	3,064.10
7895	Jno. Wagener, city treasurer.....	Interest due May 1, 1896.....	8,750.00
7896	C. E. Green, register of deeds....	Abstracts right of way land..	51.50
7897	The Western Supply Co.....	Lead pipe.....	64.77
7898	Million & Young.....	Est. No. 11, pipe laying, 1895..	35.02
7899	Wedelstaedt & Carmen.....	Printing envelopes.....	1.50
7900	D. L. Curtice.....	Mounted plates, city atlas....	6.00
7901	Percy W. Parker.....	Insurance on office.....	82.50
7902	Sherwood, Sutherland & Co.....	Pile driving, McCarron Lake..	168.30
7903	P. H. Kelly Mercantile Co.....	Oil, candles, etc.....	17.18
7904	P. H. Kelly Mercantile Co.....	Est. No. 2, lubricating oil....	30.85
7905	National Meter Co.....	Est. No. 4, meters.....	300.00
7906	The Engineering Record.....	1 year sub. to March 1, 1897..	5.00
7907	Prendergast Bros.....	Oil heater, Venturi meter house.....	6.00
7908	Pioneer Fuel Co.....	Advertising.....	2.70
7909	Minnesota Engine Works.....	Repairing valve, head pump....	33.60
7910	Dr. C. F. Sweeney.....	Professional services, man hurt by blast.....	9.00
7911	Pioneer Fuel Co.....	Est. No. 8, fuel.....	199.21
7912	Pioneer Press Co.....	Printing water bills.....	60.75
7913	Allen & Co.....	Livery.....	9.00
7914	H. C. Boyeson & Co.....	Stationery.....	3.70
7915	P. N. Lindquist.....	Horseshoeing.....	7.00
7916	Wedelstaedt & Carmen.....	Envelopes.....	3.00
7917	J. W. Martin Lumber Co.....	Lumber.....	8.00
7918	Cornplanter Oil Co.....	Gasoline.....	.65
7919	The Western Supply Co.....	Pig tin, check valves, etc....	19.71
7920	The Crane-Ordway Co.....	Pipe, valves, etc.....	33.57
7921	Farwell, Ozmun, Kirk & Co.....	Powder, lantern, globes, etc..	2.74
7922	Robinson & Cary Co.....	Oil filter, tools, etc.....	27.97
7923	Union Brass and Metal Mfg Co..	Brass goods.....	50.54
7924	Est. of Jas. Gilfillan....	Rent of storage lot.....	25.00
7925	Mahle & Sutmar.....	Sharpening tools.....	5.68
7926	Dan Cashill & Co.....	Horseshoeing.....	2.00
7927	Chas. Friend & Son.....	Harness fittings.....	4.80
7928	J. G. Duggan.....	Blacksmithing.....	10.35
7929	Morton Jones.....	Wood for Baldwin Lake.....	37.50
7930	Andrew Toomey.....	Est. No. 4, supplement to No. 3	35.00
7931	Jno. Caulfield, secretary.....	Cash advanced.....	48.80
7932	Water and Gas Review Pub. Co..	1 year sub. to April, 1897....	1.09
7933	Theo. Vandlae.....	Est. No. 9, hauling coal.....	11.34
7934	Smith & Farwell Co.....	Desk, etc., supt. office.....	41.75
7935	Mitsch Wagon and Carriage Co..	Sharpening tools.....	5.23
7936	Peter Cardinal.....	Land for right of way.....	240.00
7937	Brown, Tracy & Co.....	Job printing.....	6.00
7938	The Dispatch Printing Co.....	Advertising.....	4.50
7939	C. E. Green, register of deeds....	Abstract and record.....	2 25
Total .....			\$14,045.06



## LIST OF VOUCHERS—Continued.

MAY, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
7940	St. Paul Furniture Co.....	Repairing bookcase.....	\$12.00
7941	Jas. H. Nelson.....	Wood for Baldwin Lake.....	34.00
7942	The N. W. Telephone Ex Co.....	Repair and rent of telephones.....	11.75
7943	Wedelstaedt & Carmen.....	Printing.....	9.74
7944	Pioneer Press Co.....	Meter billbook.....	13.80
7945	Daily Globe.....	Advertising.....	4.50
7946	The Leonard Soap Co.....	Oil soap.....	4.00
7947	Million & Young.....	Est. No. 12, final laying mains.....	57.13
7948	H. Mueller Mfg Co.....	Drills and taps.....	36.00
7949	National Meter Co.....	Est. No. 5, meters.....	300.00
7950	The Engineering Record.....	Advertising for wells.....	6.40
7951	Fire and Water.....	Advertising for wells.....	5.00
7952	T. L. Blood & Co.....	Paint for boat.....	2.47
7953	The Engineering News Pub. Co..	Advertising for wells.....	6.20
7954	Andrew Toomey.....	Est. No. 5, and final, pump- ing station, West St. Paul..	15.00
7955	Jno. Wagener, city treasurer....	Interest due June 1, 1896.....	7,000.00
7956	Jno. Wagener, city treasurer....	Payroll for April, 1896.....	3,112.16
7957	Antoine Lamotte.....	Land for right of way.....	180.00
7958	Robinson & Cary Co.....	Valves, rubber, wire, cloth, etc.....	114.00
7959	Farwell, Ozmun, Kirk & Co.....	Tools.....	7.48
7960	Tierney & Co.....	Feed.....	1.00
7961	P. H. Kelly Mercantile Co., W. B. Jordan, assignee.....	Candles.....	6.40
7962	P. H. Kelly Mercantile Co., W. B. Jordan, assignee.....	Est. No. 3, lubricating oils....	26.60
7963	Pioneer Fuel Co.....	Est. No. 9, fuel.....	105.85
7964	Theo Vandlac.....	Est. No. 10, hauling coal, Vadnais lake.....	11.00
7965	Allen & Co.....	Livery.....	3.00
7966	Jno. Martin Lumber Co.....	Lumber.....	10.56
7967	Pioneer Press Co.....	Printing.....	31.25
7968	Franklin Machine Works.....	Repairing tapping machine....	1.50
7969	Minnesota Engine Works.....	Repairs West side pump.....	4.46
7970	So. Park Foundry and Mach. Co..	Repairing hydrant valves....	20.70
7971	Crane-Ordway Co.....	Pipe, packing, etc.....	40.09
7972	Loving Shoe Co.....	Rubber boots.....	21.00
7973	N. W. Telephone Co.....	Rent of telephone and repairs..	8.75
7974	J. G. Duggan.....	Blacksmithing.....	12.05
7975	Dan Cashill.....	Horseshoeing.....	4.00
7976	J. W. Cunningham.....	Printing specifications conduit, Centerville.....	10.50
7977	P. N. Lindquist.....	Horseshoeing.....	2.00
7978	D. I. Bell.....	Fire brick and cement.....	22.49
7979	The Anoka Herald.....	Publishing right of way notice	79.20
7980	Chas. D. Lynch.....	50 2-inch drip valves.....	200.00
7981	Jno. Caulfield, secretary.....	Cash advanced per voucher..	56.64
7982	H. C. Boyeson.....	Stationery.....	19.25
7983	Mitsch Wagon and Carriage Co..	Hangers for force main.....	14.62
7984	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
7985	Cornplanter Oil Co.....	Oil and gasoline.....	16.17
7986	The Western Supply Co.....	Lead pipe, etc.....	55.07
7987	St. Paul Furniture Co.....	Lumber.....	5.80
7988	Union Brass and Metal Mfg Co..	Est. No. 1, brass goods.....	57.51
7989	Union Brass and Metal Mfg Co..	Springs for pumps, valves, etc.	30.90
7990	Boggs & Hoyt.....	Oats.....	44.06
7991	Hennessey & Cox.....	Wire rope.....	54.72
7992	The Western Supply Co.....	Lead pipe.....	1,355.99
7993	Francis Lamotte.....	Land for right of way.....	65.00
7994	Geo. J. Mitsch & Co.....	Supplies.....	13.20

## LIST OF VOUCHERS—Continued.

MAY, 1896—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
7995	A. B. Bell.....	Ins. Union Park Station.....	19.50
7996	The Anoka Herald.....	Advertising condemnation for right of way.....	25.50
7997	Chas. E. Green, register of deeds..	Abstracts for right of way...	13.75
7998	Fire and Water.....	Advertising for wooden con- duit .....	6.00
7999	The Engineering Record.....	Advertising for wooden con- duit .....	5.80
8000	The Engineering News Pub. Co..	Advertising for wooden con- duit .....	11.20
8001	Jos. Lamotte.....	Land at Centerville.....	1,050.00
8002	Jos. Lamotte.....	Land at Centerville.....	600.00
8003	Frank Hart.....	Commissioner condemn land..	25.00
8004	L. D. Browning.....	Commissioner condemn land..	25.00
8005	C. D. Tuthill.....	Commissioner condemn land..	25.00
Total .....		.....	\$15,174.71

## LIST OF VOUCHERS—Continued.

JUNE, 1896.

No. of Voucher.	NAME.	CLAIM.	AMOUNT.
8006	C. L. Horst, city treasurer.....	Payroll for May, 1896.....	\$4,316.17
8007	C. L. Horst, city treasurer.....	Interest due July 1, 1896.....	5,850.00
8008	Dan Cashill.....	Horseshoeing.....	8.25
8009	Union Brass and Iron Works.....	Est. No. 2, brass goods.....	235.54
8010	Union Brass and Metal Mfg Co..	Pump springs.....	13.75
8011	Chas. Friend & Son.....	Umbrella, etc.....	2.75
8012	Merrill, Odgen & Greer.....	Water cooler, etc.....	3.15
8013	Farwell, Ozmun, Kirk & Co.....	Hardware.....	36.46
8014	St. Paul Tent and Awning Co....	Awnings.....	18.75
8015	Pioneer Press Co.....	Printing.....	7.50
8016	Prendergast Bros.....	Thimble stops.....	.70
8017	T. L. Blood & Co.....	Paints, etc.....	16.25
8018	N. W. Engineering Co.....	Electric lamps.....	11.00
8019	Boeringer & Son.....	Level bulb in transit.....	1.00
8020	N. W. Stamp Works.....	Date stamps, etc.....	1.65
8021	Minnesota Engine Works.....	Machine work.....	4.75
8022	A. Decker.....	Lawn mower.....	4.50
8023	Justus Kahlert.....	Sharpening lawn mower.....	1.25
8024	Crane-Ordway Co.....	Stop boxes, etc.....	77.15
8025	The Western Supply Co.....	Pipe fittings, etc.....	3.35
8026	The Western Supply Co.....	Est. No. 2, lead pipe, etc.....	82.44
8027	The St. Paul Rubber Co.....	Rubber boots.....	14.04
8028	St. Paul Sash, Door & Lbr. Co...	Screens.....	7.75
8029	J. G. Duggan.....	Repairing buggy, etc.....	35.65
8030	Mahle & Sutmar.....	Sharpening tools, etc.....	2.83
8031	Wedelstaedt & Carmen.....	Printing.....	4.75
8032	Cornplanter Oil Co.....	Oil.....	6.73
8033	Est. Jas. Gilfillan.....	Rent of storage lot.....	25.00
8034	Daily Globe.....	Advertising.....	22.44
8035	P. H. Kelly Mercantile Co.....	Brooms, etc.....	17.90
8036	P. H. Kelly Mercantile Co.....	Est. No. 4, lubricating oils...	17.88
8037	H. C. Boyeson & Co.....	Stationery.....	10.08
8038	St. Paul Rubber Co.....	Hose clamps, etc.....	8.33
8039	A. H. Fitch, clerk district court..	Award damage for land, Centerville.....	1,324.40
8040	H. M. Smyth Printing Co.....	Printing.....	3.90
8041	Thos. Brennan Lumber Co.....	Est. No. 1, and final, lumber...	305.00
8042	Tierney & Co.....	Feed.....	.58
8043	Jno. Caulfield, secretary.....	Cash advanced.....	147.53
8044	Pioneer Fuel Co.....	Est. No. 10, fuel.....	1,173.65
8045	So. Park Foundry and Mach. Co...	Est. No. 1, valves.....	118.00
8046	Jno. Martin Lumber Co.....	Lumber.....	36.20
8047	Chas. Stone.....	Est. No. 4, and final, pump well, etc., Vadnais Lake....	300.00
8048	Jas. Lamotte.....	Making road to right of way.	35.00
8049	Jas. Carpenter.....	Lumber for box drain.....	5.37
8050	J. F. McCarthy.....	Est. No. 1, artesian well, Centerville.....	4,845.00
Total .....			\$19,164.37

## LIST OF VOUCHERS—Continued.

JULY, 1896.

No. of Voucher.	NAME.	CLAIM.	AMOUNT.
8051	C. L. Horst, city treasurer.....	Payroll for June, 1896.....	\$4,467.95
8052	C. L. Horst, city treasurer.....	Interest due Aug. 1, 1896.....	3,750.00
8053	Board of Fire Commissioners.....	Condemned hose.....	60.00
8054	Allen & Co.....	Livery.....	21.00
8055	Sampson & Dennis.....	Valve seating machine.....	67.00
8056	So. Park Foundry and Mach. Co..	Est. No. 1, valves.....	776.80
8057	Bingham & Taylor.....	Est. No. 1, stop boxes, etc....	1,007.74
8058	M. J. Drummond.....	Est. No. 1, cast iron pipe.....	1,913.12
8059	Dennis Long & Co.....	Est. No. 1, cast iron pipe.....	15,297.51
8060	The Ohio Pipe Co.....	Est. No. 1, water pipe.....	3,089.79
8061	Hersey Mfg. Co.....	Meter fittings.....	64.10
8062	National Meter Co.....	Est. No. 6, meters.....	840.00
8063	Wm. H. McIntyre.....	Row boat for Lake Phalen...	16.00
8064	P. Schollert.....	Papering and kalsomining....	110.82
8065	Jos. N. Forcier.....	Board of engineers.....	12.25
8066	The N. W. Telephone Ex. Co.....	Rent of telephone.....	7.25
8067	Joel T. Million.....	Est. No. 1, pipe laying, Duke street.....	518.22
8068	Patrick Doherty.....	Est. No. 1, pipe laying.....	155.55
8069	Ninnis & Meyer.....	Electric belis and speaking tube.....	23.27
8070	A. & W. McGuiggan.....	Carpenter work.....	4.20
8071	A. R. Starkey.....	One 16-inch iron pipe.....	16.88
8072	St. Paul Plow Co.....	Est. No. 1, special castings..	280.42
8073	The N. W. Telephone Ex. Co.....	Rent of telephone.....	7.25
8074	Jno. Martin Lumber Co.....	Lumber.....	8.00
8075	The Crane-Ordway Co.....	Packing, pipe, fittings, etc....	70.89
8076	Daily Globe.....	Advertising.....	9.11
8077	Robinson & Cary Co.....	Waste pipe, fittings, etc....	23.18
8078	The Western Supply Co.....	Pipe and pipe fittings.....	30.22
8079	Ailen & Co.....	Livery.....	4.00
8080	P. H. Kelly Mercantile Co.....	Est. No. 5, lubricating oils....	8.22
8081	P. H. Kelly Mercantile Co.....	Tea lead, candles, etc.....	26.59
8082	Noyes Bros. & Cutler.....	Clover seed, Vadnais Lake....	4.78
8083	New England Furniture Co.....	Carpets for office.....	80.42
8084	Smith & Farwell Co.....	Chairs for office.....	15.00
8085	H. C. Boyeson.....	Stationery.....	5.65
8086	N. W. Stamp Works.....	Bank deposit stamps.....	2.25
8087	Martin Feist.....	Lunch for men cleaning conduit.....	3.50
8088	J. G. Duggan.....	Blacksmithing.....	5.60
8089	Mitsch Wagon and Carriage Co..	Sharpening tools.....	14.89
8090	D. L. Bell.....	Cement.....	16.50
8091	Dan Cashill.....	Horseshoeing.....	7.50
8092	Pioneer Fuel Co.....	Est. No. 11, fuel.....	112.81
8093	E. C. Huebner.....	Lumber.....	26.49
8094	R. Wellish.....	Est. No. 3, valves.....	72.00
8095	Jas. Shiely.....	Est. No. 1, drayage.....	212.06
8096	Farwell, Ozmun, Kirk & Co.....	Tools.....	16.90
8097	Jno. Caulfield, secretary.....	Cash advanced by voucher....	112.55
8098	Nicholas Feyer.....	Est. No. 1, hauling to Centerville.....	151.99
8099	Dennis Long & Co.....	Est. No. 2, cast iron pipe.....	12,178.72
8100	Dennis Long & Co.....	Est. No. 1, Centerville.....	1,731.78
8101	The Ohio Pipe Co.....	Est. No. 2, cast iron pipe.....	1,669.26
8102	So. Park Foundry and Mach. Co..	Est. No. 1, fire hydrants.....	263.50
8103	St. Paul Foundry Co.....	Est. No. 1, specials Centerville	1,938.16
8104	Jas. Shiely.....	Drayage to office.....	6.63
8105	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8106	Thos. Brennan Lumber Co.....	Lumber.....	73.88
8107	Geo. H. Lawes & Co.....	Paving brick.....	14.50

## LIST OF VOUCHERS—Continued.

JULY, 1893—Continued.

No. of Voucher.	NAME.	CLAIM.	AMOUNT.
8108	Odgen, Merrill & Greer.....	Glasses .....	\$0.29
8109	Cornplanter Oil Co.....	Gasoline .....	1.95
8110	H. Wedelstaedt & Co.....	Drawing cloth and paper....	6.88
8111	A. Decker & Co.....	Nails .....	.50
8112	R. Price.....	Veterinary services.....	Void
8113	C. E. Green, register of deeds....	Recording deeds and abstracts	4.25
8114	R. H. Hunt & Co.....	Inspecting pipe.....	403.51
8115	Wedelstaedt & Carmen.....	Printing .....	20.10
8116	J. F. McCarthy.....	Est. No. 2, wells at Centerville	2,887.96
Total .....		.....	\$54,775.09



## LIST OF VOUCHERS—Continued.

AUGUST, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
8117	C. L. Horst, city treasurer.....	Payroll for July, 1896.....	\$4,349.36
8118	C. L. Horst, city treasurer.....	Interest due Sept. 1, 1896.....	6,750.00
8119	Patrick Doherty.....	Est. No. 2, pipe laying.....	645.57
8120	J. T. Million.....	Est. No. 2, and final, main on Duke street.....	509.76
8121	Jas. Shielly.....	Est. No. 2, drayage.....	790.06
8122	Fielding & Shepley.....	Relaying pavement.....	47.14
8123	Jno. Rogers, Jr., & Bro.....	Fire insurance.....	82.50
8124	C. L. Horst, city treasurer.....	Street sprinkling assessment, 1894-95.....	10.20
8125	Jas. N. Forcler.....	Teaming for engineers.....	11.50
8126	L. L. May & Co.....	Lawn seed.....	7.00
8127	N. W. Shot and Lead Co.....	Lead pipe.....	65.63
8128	Scribner-Libby Co.....	Iron hood for chimney, Vadnais lake.....	11.00
8129	J. G. Duggan.....	Blacksmithing.....	6.20
8130	So. Park Foundry and Mach. Co..	Est. No. 4, valves.....	320.00
8131	So. Park Foundry and Mach. Co..	Est. No. 2, hydrants.....	504.30
8132	Dennis Long & Co.....	Est. No. 3, pipe for city.....	7,797.27
8133	Dennis Long & Co.....	Est. No. 2, pipe for Centerville.....	3,651.37
8134	National Meter Co.....	Est. No. 7, meters.....	900.00
8135	The Ohio Pipe Co.....	Est. No. 3, pipe.....	900.16
8136	Bingham & Taylor.....	Est. No. 2, valve boxes.....	81.00
8137	H. C. Boyeson & Co.....	Stationery.....	12.65
8138	Wedelstaedt & Carmen.....	Printing.....	3.50
8139	Dan Cashill & Co.....	Horseshoeing.....	5.00
8140	Est. Jas. Gilfillan.....	Rent of storage lot.....	25.00
8141	Pioneer Press Co.....	Advertising.....	1.20
8142	St. Paul Stone Co.....	Cement tiles.....	4.80
8143	Minnesota Engine Works.....	Machine work on pump.....	2.00
8144	D. F. De Wolf.....	Hay.....	11.28
8145	P. N. Lindquist.....	Horseshoeing.....	4.00
8146	Allen & Co.....	Livery.....	13.50
8147	Union Brass and Metal Mfg Co..	Brass springs for pump, Baldwin lake.....	3.75
8148	Mitsch Wagon and Carriage Co..	Sharpening tools, etc.....	15.99
8149	Jno. Martin Lumber Co.....	Lumber.....	18.13
8150	Cornplanter Oil Co.....	Gasoline.....	1.30
8151	D. L. Bell.....	Cement.....	11.10
8152	Chas. Friend & Son.....	Harness fittings.....	5.40
8153	A. Decker & Co.....	Tools for reservoir, etc.....	2.85
8154	Pioneer Fuel Co.....	Est. No. 2, fuel.....	342.18
8155	Theo. Vandlac.....	Est. No. 11, hauling coal, Vadnais lake.....	11.06
8156	P. H. Kelly Mercantile Co.....	Soap, lye, etc., McCarron Lake.....	7.35
8157	P. H. Kelly Mercantile Co.....	Est. No. 6, lubricating oils.....	45.68
8158	F. W. Luley & Son.....	Tallow for plumbing.....	.50
8159	Robinson & Cary Co.....	Tools, etc.....	11.88
8160	Farwell, Ozmun, Kirk & Co.....	Powder, nails and tools.....	39.26
8161	The Crane-Ordway Co.....	Pipe and pipe fittings.....	42.40
8162	Geo. J. Mitsch & Co.....	Supplies.....	9.10
8163	L. A. Plaster & Co.....	Painting pump house, Vadnais.....	34.00
8164	A. W. McGuiggan.....	Office at Centerville.....	90.00
8165	The Western Supply Co.....	Pipe fittings.....	2.22
8166	R. W. Hunt & Co.....	Inspecting pipe.....	168.27
8167	The N. W. Telephone Ex. Co.....	Rent of telephones.....	7.25
8168	Jas. Ceyriac.....	Hay.....	5.00
8169	The N. W. Telephone Ex. Co.....	Rent of private line instruments.....	25.00
8170	J. W. Cunningham & Co.....	50 division books.....	8.00
8171	A. P. Smith.....	Est. No. 4, sleeves and valves.....	388.00

## LIST OF VOUCHERS—Continued.

AUGUST, 1896—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8172	St. Paul Plow Co.....	Est. No. 2, specials for city..	140.71
8173	N. W. Shot and Lead Works.....	Est. No. 1 and final, pig lead..	1,413.15
8174	Brown, Treacy & Co.....	200 specifications.....	23.00
8175	Henry E. Lee, county treasurer..	Taxes on right of way prop- erty .....	21.91
8176	Jno. Caulfield, secretary.....	Cash advanced per voucher...	30.96
8177	St. Paul Sash, Door and L. Co...	24 fire hydrant boxes.....	7.20
8178	Daily Globe.....	Advertising .....	8.87
8179	David Capistrant.....	Right of way.....	150.00
8180	Clement Cardinal.....	Earth for conduit line.....	100.00
8181	Hennessey & Cox.....	Est. No. 1, conduit line, Cen- terville .....	3,655.00
8182	Hennessey & Cox.....	Est. No. 1, engine house, Cen- terville .....	1,275.00
8183	J. F. McCarthy.....	Est. No. 3, wells at Center- ville .....	5,087.96
8184	N. Feyen.....	Est. No. 1, laying pipe and connecting wells .....	552.50
8185	N. Feyen.....	Est. No. 2, drayage to Cen- terville .....	180.01
Total .....			\$41,464.89

## LIST OF VOUCHERS—Continued.

SEPTEMBER, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
8186	Chas. L. Horst, city treasurer....	Payroll for August, 1896.....	\$4,869.61
8187	Chas. L. Horst, city treasurer....	Interest due Oct. 1, 1896.....	25,000.00
8188	National Meter Co.....	Est. No. 8, meters.....	600.00
8189	Fairbanks, Morse & Co.....	Testing scales, Lake Vadnais.....	2.50
8190	J. W. Cunningham & Co.....	Job printing.....	16.40
8191	The N. W. Telephone Ex. Co.....	Rent of telephones, September.....	7.25
8192	J. G. Duggan.....	Blacksmithing.....	1.60
8193	Joseph Cartier.....	Rent of portable engines, Centerville.....	25.50
8194	Joseph Carpenter.....	Lumber.....	20.16
8195	David Capistrant.....	Oak stringers for bridge.....	2.80
8196	Joseph Trudeau.....	Nails for bridges.....	1.33
8197	M. J. Drummond.....	Est. No. 2 and final, 8 to 20 inch pipe for Centerville....	47.49
8198	The Ohio Pipe Co.....	Est. No. 4, and final, 6 to 16- inch pipe for city.....	341.02
8199	Est. Jas. Gilfillan.....	Rent of storage lot.....	25.00
8200	H. E. Wedelstaedt.....	Drawing paper.....	3.50
8201	P. H. Kelly Mercantile Co.....	Est. No. 7, lubricating oils....	7.75
8202	P. H. Kelly Mercantile Co.....	Brooms, candles, etc.....	8.20
8203	St. Paul Sidewalk Co.....	Cement flagging.....	2.15
8204	T. L. Blood & Co.....	Oil and turpentine.....	2.48
8205	Mitsch Wagon and Carriage Co.....	Sharpening tools.....	4.92
8206	Scribner-Libby Co.....	Roof on stable and shop.....	39.00
8207	D. L. Bell.....	Louisville cement.....	8.85
8208	Pioneer Press Co.....	Advertising water rents due.....	7.20
8209	G. Sommers & Co.....	G. A. R. decorations, office....	6.10
8210	Chas. Friend & Son.....	Harness fittings.....	3.95
8211	Wedelstaedt & Carmen.....	Printing postal cards and envelopes.....	5.25
8212	Franklin Machine Works.....	Sharpening drill.....	1.00
8213	Griggs Bros.....	5,900 pounds oats.....	36.88
8214	H. C. Boyeson & Co.....	Blank books and stationery....	64.35
8215	P. N. Lindquist.....	Horseshoeing.....	2.00
8216	Dan'l Cashill & Co.....	Horseshoeing.....	6.00
8217	The Western Supply Co.....	Pipe, pipe fittings, packing, etc.....	48.64
8218	Union Brass and Metal Mfg Co.....	Brass bolts, etc.....	24.20
8219	Minnesota Engine Works.....	Repairing revolution counter.....	.75
8220	Crane-Ordway Co.....	Pipe fittings, etc.....	40.38
8221	Farwell, Ozmun, Kirk & Co.....	Nails and tools.....	13.01
8222	St. Paul Rubber Co.....	8 pairs men's hip boots.....	30.64
8223	Cornplanter Oil Co.....	Oil.....	6.50
8224	Tierney & Co.....	Bran.....	.80
8225	F. W. Luley & Son.....	Tallow.....	2.40
8226	Fairbanks, Morse & Co.....	Est. No. 1, pipelaying to reservoir.....	593.41
8227	Theo. Vandlac.....	Est. No. 12, hauling coal to Vadnais.....	23.33
8228	Pioneer Fuel Co.....	Est. No. 13, fuel.....	1,306.77
8229	Western Supply Co.....	Commutator for dynamo.....	32.35
8230	Daily Globe.....	Advertising.....	10.54
8231	Martin Feist.....	Lunch for men cleaning conduit.....	3.50
8232	John Caulfield, secretary.....	Cash advanced for voucher....	70.49
8233	So. Park Foundry and Mach. Co.....	Est. No. 5, valves.....	1,272.00
8234	St. Paul Plow Co.....	Est. No. 3, special castings....	362.71
8235	Allen & Co.....	Livery.....	17.00
8236	Dispatch Printing Co.....	Advertising.....	12.00
8237	Hennessey & Cox.....	Est. No. 2, Centerville conduit.....	6,128.16

## LIST OF VOUCHERS—Continued.

SEPTEMBER, 1896—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8238	Hennessey & Cox.....	Est. No. 2, engine house, Centerville .....	3,995.00
8239	J. F. McCarthy.....	Est. No. 4, wells at Center- ville .....	1,463.19
8240	N. Feyen.....	Est. No. 2, connecting wells at Centerville .....	807.50
8241	Adam Decker.....	Hardware .....	1.65
8242	Mahle & Sutmar.....	Repairing buggies, etc.....	6.90
8243	P. Doherty.....	Est. No. 3, pipelaying, city...	1,436.04
8244	St. Paul Foundry Co.....	Est. No. 2, specials for Cen- terville .....	1,451.03
8245	N. Feyen.....	Est. No. 3, drayage to Center- ville .....	79.44
	Total .....	.....	\$50,410.57

## LIST OF VOUCHERS—Continued.

OCTOBER, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
8246	C. L. Horst, city treasurer.....	Interest due Nov. 2, 1896.....	\$8,750.00
8247	J. H. Sherman.....	Right of way for overflow of surface water.....	425.00
8248	A. L. Washburn.....	Electric light office.....	35.00
8249	Fielding & Shepley.....	Relaying pavement.....	221.89
8250	H. M. Smyth Printing Co.....	Order books.....	4.50
8251	Jno. Martin Lumber Co.....	Lumber.....	16.16
8252	So. Park Foundry and Mach. Co..	Est. No. 6, valves.....	360.00
8253	So. Park Foundry and Mach. Co..	Est. No. 3, fire hydrants.....	156.75
8254	Jas. Shiely.....	Est. No. 3 and final, drayage..	108.11
8255	National Meter Co.....	Est. No. 9, meters.....	700.00
8256	Dennis Long & Co.....	Est. No. 4, iron pipe for city..	740.17
8257	Dennis Long & Co.....	Est. No. 3, pipe for Center- ville.....	224.44
8258	C. Newman.....	Lunches for engineers, com- missioners.....	31.15
8259	Theophile Vandlac.....	Est. No. 13, hauling coal, Vadnais Lake.....	22.19
8260	Hennessey & Cox.....	Repairing paving.....	60.09
8261	Pioneer Press Co.....	Printing.....	60.75
8262	Ransome Subway Co.....	Est. No. 5, conduit to Otter Lake.....	1,000.00
8263	C. L. Horst, city treasurer.....	Payroll for September.....	4,233.18
8264	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8265	Robinson & Cary Co.....	Tools.....	29.32
8266	The Western Supply Co.....	Jute packing.....	26.61
8267	Chas. Friend & Son.....	Leather and harness fittings..	4.45
8268	Mitsch Wagon and Carriage Co..	Tools.....	3.34
8269	Crane-Ordway Co.....	Pipe and pipe fittings.....	33.35
8270	Dan Cashill & Co.....	Horseshoeing.....	6.00
8271	Brown, Treacy & Co.....	Job printing.....	8.50
8272	Merrill, Odgen & Greer.....	Lamp fixtures.....	.60
8273	Fairbanks, Morse & Co.....	1 8-inch $\frac{1}{8}$ bend.....	2.81
8274	H. C. Boyeson.....	Stationery.....	21.25
8275	Corplanter Oil Co.....	Oil.....	11.05
8276	D. L. Bell.....	Utica cement.....	5.60
8277	Farwell, Ozmun, Kirk & Co.....	Powder, fuse and tools.....	20.30
8278	The Globe Co.....	Advertising.....	6.46
8279	Jno. Martin Lumber Co.....	Lumber.....	65.82
8280	Pioneer Press Co.....	Advertising.....	18.95
8281	Wedelstaedt & Carmen.....	Job printing.....	1.50
8282	P. N. Lindquist.....	Horseshoeing.....	2.00
8283	J. G. Duggan.....	Blacksmithing.....	13.80
8284	N. W. Fuel Co.....	Coal.....	83.53
8285	C. E. Green.....	Abstracts, recording papers...	4.00
8286	So. Park Foundry and Mach. Co..	Est. No. 6, valves.....	96.00
8287	So. Park Foundry and Mach. Co..	Repacking hydrant valves....	13.80
8288	St. Paul Foundry Co.....	Est. No. 3, specials for Cen- terville.....	141.26
8289	St. Paul Foundry Co.....	Special castings, smoke stack..	8.76
8290	Union Brass and Metal Mfg Co..	Est. No. 3, brass goods.....	75.00
8291	Union Brass and Metal Mfg Co..	Brass goods.....	3.00
8292	Pioneer Fuel Co.....	Est. No. 14, fuel.....	226.85
8293	P. H. Kelly Mercantile Co.....	Est. No. 8, lubricating oils....	32.22
8294	P. H. Kelly Mercantile Co.....	1 bbl. W. W. oil, matches, etc	6.40
8295	Allen & Co.....	Livery.....	25.00
8296	Mahle & Sutmar.....	Wagon repairs.....	10.30
8297	Fire and Water.....	One year subscription.....	3.00
8298	Geo. J. Mitsch & Co.....	Supplies.....	6.65
8299	A. Decker & Co.....	Tools.....	4.55
8300	Dispatch Printing Co.....	Advertising.....	2.00
8301	The N. W. Telephone Ex. Co.....	Rent of telephones.....	7.25
8302	Board of Fire Commissioners....	200 feet condemned hose.....	40.00



## LIST OF VOUCHERS—Continued.

OCTOBER, 1896—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8303	Hobart & Willis.....	One 4-inch Ell.....	1.90
8304	A. H. Fitch, clerk of district court	Fees right of way matter....	25.00
8305	St. Paul Plow Co.....	Est. No. 4, specials.....	348.88
8306	Fielding & Shepley.....	Relaying pavement.....	9.89
8307	D. Cardinal.....	Hay.....	25.62
8308	Jno. Caulfield, secretary.....	Cash advanced per vouchers..	29.87
8309	Patrick Doherty.....	Est. No. 4, pipelaying.....	511.51
8310	Jos. M. Forcier.....	Teaming to Baldwin Lake....	12.00
8311	J. F. McCarthy.....	Est. No. 5, wells at Centerville .....	2,300.73
8312	Hennessey & Cox.....	Est. No. 3, engine house, Centerville .....	1,955.00
8313	Hennessey & Cox.....	Est. No. 3, wooden conduit, Centerville .....	3,859.34
8314	Nicholas Feyen.....	Est. No. 3, pipelaying, Centerville .....	765.00
8315	Fairbanks, Morse & Co.....	Est. No. 2, laying 36-in. main to reservoir.....	4,360.46
8316	C. L. Horst, city treasurer.....	For investment in sinking fund .....	15,000.00
8317	Great Northern Railroad Co.....	Repairing track over Rice street main.....	5.03
8318	Nicols & Dean.....	300 feet $\frac{3}{4}$ round iron, Centerville .....	8.70
8319	N. W. Stamp Works.....	Three inspectors' badges.....	2.25
8320	Wedelstaedt & Carmen.....	Printing .....	5.75
8321	J. M. Molliter.....	Drayage to Baldwin Lake....	1.00
8322	R. N. Cardozo.....	Stove, etc., engineers at Centerville .....	4.25
8323	Jno. Rogers, Jr., & Bro.....	Insuring boilers, pump house.	150.00
8324	Minnesota Engine Works.....	3 moulds for dash pots, Vadnais .....	2.93
8325	So. Park Foundry and Mach. Co..	36 5-inch hydrant stuff boxes.	25.20
8326	St. Paul Foundry Co.....	Channel iron for boilers, Centerville .....	52.64
8327	Jos. Garcean.....	Blacksmithing .....	2.35
8328	Thos. Brennan Lumber Co.....	Est. No. 2, lumber, Otter Lake .....	436.68
8329	The Western Supply Co.....	Est. No. 1, lead pipe.....	329.42
8330	N. W. Shot and Lead Works....	Pig lead and lead pipe.....	304.57
8331	St. Paul Lime and Cement Co....	Sewer pipe, brick and cement.	107.71
8332	N. Feyen.....	Est. No. 4 and final, connecting wells, Centerville.....	851.76
8333	J. F. McCarthy.....	Est. No. 6, final, sinking wells, Centerville .....	54.59
8334	Thomson Meter Co.....	Meter repairs.....	6.05
8335	N. Hendy.....	Damages .....	50.00
8336	N. Feyen.....	Est. No. 1, final, moving boilers .....	74.00
Total .....			\$49,925.74

## LIST OF VOUCHERS—Continued.

NOVEMBER, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
8337	C. L. Horst, city treasurer.....	Pay roll for October.....	\$4,732.21
8338	C. L. Horst, city treasurer.....	Interest due Dec. 11, 1896.....	7,000.00
8339	Menominee Pressed Brick Co.....	Sewer brick.....	195.00
8340	Jos. Peltier.....	One cord oak.....	2.50
8341	Napoleon Sorigny.....	Timber for intake, Centerville.....	27.32
8342	Fairbanks, Morse & Co.....	Two lead pouring clamps.....	6.50
8343	St. Paul Co-Operative Painting Co.....	Papering and painting third floor office.....	38.00
8344	Jno. Gorman.....	Lamp cord and tubing.....	.80
8345	Jacob Brunner.....	Three revolve lamp shades.....	6.50
8346	Nicols & Dean.....	Iron and blacksmith coal.....	15.09
8347	Hennessey & Cox.....	Repairing asphalt.....	24.27
8348	Pioneer Press Co.....	Advertising.....	.63
8349	So. Park Foundry and Mach. Co..	Repairing valves.....	20.88
8350	N. W. Telephone Ex. Co.....	Labor, repairing private line.....	10.25
8351	Tierney & Co.....	Feed.....	.75
8352	Daily Globe.....	Advertising.....	.50
8353	Jno. Martin Lumber Co.....	Lumber.....	35.16
8354	Chas. Friend & Son.....	Harness fittings.....	1.95
8355	D. L. Bell.....	Brick cement, etc.....	82.75
8356	Wm. Manteufellel.....	One case, with drawers.....	6.00
8357	J. G. Duggan.....	Sharpening tools.....	5.60
8358	Dan'l Cashill & Co.....	Horseshoeing.....	6.00
8359	Wedelstaedt & Carmen.....	500 envelopes.....	1.50
8360	Crane-Ordway Co.....	Pipe and pipe fittings.....	28.83
8361	Robinson & Cary Co.....	Tools, waste, etc.....	53.25
8362	The Western Supply Co.....	Packing pipe fittings.....	14.52
8363	Farwell, Ozmum, Kirk & Co.....	Powder, nails and tools.....	42.05
8364	P. H. Kelly Mercantile Co.....	One box candles.....	4.80
8365	P. H. Kelly Mercantile Co.....	Est. No. 9, lubricating oils.....	31.01
8366	St. Paul Foundry Co.....	Iron work, Centerville.....	22.87
8367	Adam Decker & Co.....	Tools.....	3.25
8368	Geo. J. Mitsch & Co.....	Supplies.....	7.91
8369	Dispatch Printing Co.....	Advertising.....	1.05
8370	H. C. Boyeson & Co.....	Stationery.....	12.15
8371	T. L. Blood & Co.....	Paint.....	.55
8372	Brown, Treacy & Co.....	Blank books.....	14.45
8373	Cornplanter Oil Co.....	Oil and gasoline.....	6.60
8374	Pioneer Fuel Co.....	Est. No. 15 and final, 1895 contract.....	11.72
8375	Pioneer Fuel Co.....	Est. No. 1, 1896.....	187.03
8376	Theo. Vandlac.....	Est. No. 13, hauling coal, Vadnais.....	11.65
8377	Northwestern Fuel Co.....	Est. No. 1, wood and coal contract 1896-7.....	302.55
8378	Jno. Caulfield, secretary.....	Cash advanced as per receipts.....	42.85
8379	Mitsch Wagon and Carriage Co..	Sharpening tools.....	3.07
8380	P. N. Lindquist.....	Horseshoeing.....	2.00
8381	Allen & Co.....	Livery.....	20.00
8382	St. Paul Sidewalk Co.....	Hex. cement tiles.....	2.15
8383	Hennessey & Cox.....	Est. No. 4, pumping station, Centerville.....	637.50
8384	Hennessey & Cox.....	Est. No. 4, wooden conduit.....	7,059.51
8385	N. Feyen.....	Est. No. 4, dray to Centerville.....	209.09
8386	Patrick Doherty.....	Est. No. 5, final, pipe laying, city.....	331.94
8387	Fairbanks, Morse & Co.....	Est. No. 3, laying force main.....	1,610.12
8388	Thos. Brennan Lumber Co.....	Est. No. 3, lumber.....	598.82
8389	A. and W. McGuiggan.....	Alterations, second floor office.....	108.00
8390	Est. of Jas. Giffillan.....	Rent of storage lot.....	25.00

## LIST OF VOUCHERS—Continued.

NOVEMBER, 1896—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8391	The E. P. Allis Co.....	Est. No. 1, pumps for Center- ville .....	10,350.00
8392	Herman Thiede.....	Lumber .....	73.14
8393	N. W. Shot and Lead Co.....	Lead pipe.....	18 03
8394	Jamieson-Hevener Co.....	Oats .....	40.97
8395	So. Park Foundry and Mach. Co.	Sleeves .....	144.91
8396	Warren-Scharf Asphalt Co.....	Relaying pavement.....	46.24
8397	Wedelstaedt & Carmen.....	Deposit slips.....	7.00
8398	The People's Ice Co.....	Ice for office use.....	11.00
8399	Jas. Lamotte.....	Expressage for water samples	3.00
8400	Pioneer Press Co.....	Blank books, etc.....	30.45
8401	Wyckoff, S. & Benedict.....	Typewriter cabinet supplies..	174.40
8402	Tierney & Co.....	Hay .....	11.01
8403	Jno. Gorman.....	Electric supplies.....	4.50
8404	Hersey Mnfg. Co.....	Meter fixtures.....	69.60
8405	Sherwood-Sutherland Co.....	Rent of pile driver, Centerville	15.00
8406	Board of Fire Comm'rs.....	Telegraph poles, reservoir....	17.50
8407	St. Paul Timber and Supply Co..	Piling for Centerville.....	135.15
8408	Thos. Brennan Lumber Co.....	Est. No. 4, lumber.....	319.06
8409	Jno. Fitzgerald, Supt.....	One dozen parlor brooms.....	2.20
8410	Fielding & Shepley.....	Relaying pavement.....	14.73
8411	C. Peterson.....	Repairing clocks, pump house	2.50
8412	Jno. Caulfield, Sec'y.....	Cash advanced, as per voucher	86.80
8413	Thos. Langevin.....	Dump ground excavating Cen- terville .....	75.00
8414	Jno. Fitzgerald, Supt.....	Brooms for conduit.....	4.40
8415	St. Paul Foundry Co.....	Channel iron, etc.....	29.00
8416	St. Paul Foundry Co.....	Est. No. 4, specials.....	1,014.02
8417	Hennessy & Cox.....	Est. No. 5, conduit Centerville	2,249.10
	Total .....		\$38,575.26

## LIST OF VOUCHERS—Continued.

DECEMBER, 1896.

No. of Voucher.	NAME.	CLAIM.	Amount.
8418	C. L. Horst, city treasurer.....	Pay roll for November.....	\$4,078.14
8419	C. L. Horst, city treasurer.....	Chgs. for paying water board coupons, 1892 to 1896 inclusive .....	1,427.50
8420	Griggs Bros.....	Feed .....	4.65
8421	St. Paul Lime and Cement Co.....	Sewer pipe .....	4.50
8422	Fielding & Shepley.....	Relaying pavement .....	31.30
8423	Jos. A. Peltier.....	One cord wood, pump house, Centerville .....	3.00
8424	Jos. N. Forcier.....	Oil for pump house, Centerville .....	1.30
8425	Jos. Garceau.....	Blacksmithing .....	15.35
8426	Peter Dupre.....	Sand for pump house for boilers .....	16.00
8427	H. C. Boyeson Co.....	Stationery .....	14.85
8428	Nicols & Dean.....	Iron bolts and washers.....	14.11
8429	Pioneer Press Co.....	Printing and lithographing... ..	13.00
8430	Thos. Brennan Lumber Co.....	Lumber .....	2.57
8431	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8432	J. G. Duggan.....	Repairing tools.....	6.85
8433	D. L. Bell.....	Fire brick, lime and cement.....	56.40
8434	P. H. Kelly Mer. Co.....	Est. No. 10, lubricating oils.. ..	7.90
8435	P. H. Kelly Mer. Co.....	Oils .....	5.20
8436	Robinson & Cary Co.....	Oil .....	1.25
8437	T. L. Blood & Co.....	Asphaltum, etc.....	1.80
8438	Jno. Martin Lumber Co.....	Lumber .....	8.00
8439	Ogden, Merrill & Greer.....	Cuspidores, lantern fix., etc.. ..	4.24
8440	Farwell, Ozmum, Kirk & Co.....	Powder, fuse and nails.....	13.65
8441	Brown, Treacy & Co.....	Bottle ink .....	.25
8442	C. W. Hackett Hdw. Co.....	Staples .....	1.06
8443	Cornplanter Oil Co.....	Oil and gasoline.....	6.65
8444	The Western Supply Co.....	Valves, pipe and pipe fittings.. ..	30.29
8445	The Crane & Ordway Co.....	Radiators and pipe fittings.....	117.75
8446	Allen & Co.....	Livery .....	9.50
8447	Wyckoff, S. & Benedict.....	Typewriter supplies .....	3.78
8448	Mitsch Wagon and Carriage Co.....	Sharpening tools .....	4.74
8449	Geo. J. Mitsch & Co.....	Supplies .....	7.15
8450	Daniel Cashill & Co.....	Horseshoeing .....	11.25
8451	Jno. Kenny.....	Boiler front .....	50.00
8452	N. W. Telephone Ex. Co.....	Telephone .....	7.25
8453	P. N. Lindquist.....	Horseshoeing .....	4.00
8454	A. P. Smith Mnfg. Co.....	Repairing tapping machine.....	7.50
8455	Fairbanks, Morse & Co.....	Refitting pouring clamp.....	.75
8456	N. W. Fuel Co.....	Est. No. 2, fuel.....	1,073.37
8457	P. H. Kelly Mer. Co.....	Case of matches.....	1.20
8458	Ninnis & Meyer.....	Repairing wires .....	1.45
8459	M. J. O'Neil.....	Repairing bracket.....	.25
8460	Martin Fiest .....	Lunch for men cleaning conduit .....	3.50
8461	Nicholas Feyen.....	Est. No. 5, final, connecting wells, Centerville .....	20.00
8462	Nicholas Feyen.....	Est. No. 1, grading over conduit .....	951.15
8463	Jno. Kenny.....	Est. No. 1, boiler, McCarron's lake .....	986.00
8464	National Meter Co.....	Est. No. 10, meters.....	668.80
8465	Union Brass and Metal Co.....	Est. No. 4.....	7.20
8466	Wedelstaedt & Carmen.....	Printing .....	8.00
8467	St. Paul Fire & Marine Ins. Co.....	Insurance .....	21.80
8468	N. Feyen.....	Drayage .....	29.10
8469	Mannheimer Bros.....	One rug for office.....	24.00

## LIST OF VOUCHERS—Continued.

DECEMBER, 1896—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8470	A. and W. McGuiggan.....	Carpenter work.....	8.15
8471	Pioneer Press Co.....	Printing .....	8.00
8472	Geo. J. Grant.....	Rent of portable engine.....	34.00
8473	So. Park Foundry and Mach. Co.	Cast sleeves .....	12.46
8474	Mahle & Sutmar.....	Blacksmithing .....	25.00
8475	Jno. Caulfield, Sec'y.....	Cash advanced by voucher...	42.64
8476	N. Feyen.....	Est. No. 2, grading at Center- ville .....	143.85
8477	Hennessy & Cox.....	Est. No. 6, conduit, Centerville	6,307.19
8478	Hennessy & Cox.....	Est. No. 5, engine at Center- ville .....	1,573.50
8479	St. Paul Foundry Co.....	Special castings .....	977.98
Total .....			\$18,947.07
Grand total.....			\$385,468.79



# SUPERINTENDENT'S REPORT.

ST. PAUL, MINN., Jan. 1, 1897.

*To the Board of Water Commissioners,*

GENTLEMEN: I herewith submit my first annual report of the work done by and under your direction for the year 1896. The work done covers a period of thirteen months, four months of which the work was done under the direction of my predecessor, the odd period of time being caused by the fiscal year of the board having been changed from December 1st to December 31st, so that in the future the annual report of this department will date from January 1st of each year.

The tables herewith submitted will give everything in detail, as to the location and character of the work done, a summary of which is as follows:

## EXTENSION ACCOUNT FOR 1896.

	Lineal Feet.
Water pipe laid on high service.....	15,817
Water pipe laid on low service.....	1,916
Water pipe laid on high service, West Side.....	1,292
<hr/>	
Total .....	19,025
Or 3.6032 miles.	
Water pipe relaid (feet).....	1,508
Building wooden flume in open trench, at various points where the sides of ditch kept falling in, due to the action of frost, from Pleasant lake to north end of Wilkinson (lineal feet).....	1,122
Repiling for foundation of 20-inch force main at crossing of Rice street for a distance of (lineal feet).....	330
Fire hydrants placed during the year.....	32
Fire hydrants changed from single to double steamer.....	3
Valves placed during the year.....	36
Service pipe connections.....	540
New meters placed .....	437

## FIRE HYDRANTS.

Thirty-two fire hydrants have been placed this year, eleven of which were double steamer, making a total of twenty-two hundred and thirty-two (2,232) of both kinds now in service.

## REPAIRS ON HYDRANTS.

There have been fifty-five leaks and eleven breaks during the year. The nature and cause of repairs, enumerated separately, is as follows:

There have been thirty-four valves cut by stones, thirteen defective seat washers, one valve nut loose, three ring valves loose, one brass ring valve broken, two valve rods broken, one ring valve knee broken, eight stuffing boxes broken, two casings broken, one nozzle broken.

The location of three hydrants was changed on account of curb line having been removed, and I would recommend that in the future whenever the curb line of a street is changed that the hydrants be placed to conform with it.

## SPRINKLING STAND PIPES.

There have been five new sprinkling stand pipes placed and one whose location has been changed, making a total number now placed of two hundred and eighty-three (283). The repairs on the same were as follows:

Twenty-three leaks in valve rods, one broken by runaway, two bottom ells worn out, fourteen stand pipes cracked by frost, two reset (caused by change of curb line), thirty valves worn out, one hundred and eighteen (118) hose repaired. The latter item in a great many cases required new hose.

## REPAIRS ON MAINS.

There have been eight leaks on mains, three of which were caused by the jarring of passing trains at railroad crossings. The others were caused by defective pipe and pipe joints.

## NEW VALVES PLACED AND VALVES REPAIRED.

There have been thirty-six new valves placed, making a total of two thousand, fifty-nine (2,059) now in service.

Repairs on valves were as follows: Forty-two leaks in stuffing boxes, one rust in pinion wheel, one leak in flange joint, one defective spindle, seven by rust in gland; making a total of fifty-two repairs.

The repairs were done on the following valves:

Galvin valve .....	29
R. D. Wood valve.....	11
Boston Machine Co.....	8
Ludlow valve .....	4
<hr/>	
Total .....	52

The cost of general maintenance for hydrants, valves, etc., during the year, as compared with 1895, shows a reduction of \$2,697.42, as follows:

Hydrants, for labor.....	\$1,021.13
Hydrants, for material.....	27.06
Valves, for labor .....	418.64
Valves, for material.....	249.48
Mains, for labor.....	364.33
Tool and tool repairs' account.....	616.78
Total .....	<u>\$2,697.42</u>

The reduction in the last item is due principally to the "Contract System," adopted by your honorable board in carrying out the operations of the department, and for the remaining items, it is due to the labor force being reduced down to the minimum, without impairing the efficiency of the service for that part of the work.

#### SERVICE PIPES.

There have been five hundred and forty (540) service pipes put in this year, one hundred and fifty-six (156) of which were put in on low service and three hundred and eighty-four (384) on high service, sixty-one of which were put in for vacant property in advance of paving, making the total number of services in the city up to date fourteen thousand, seven hundred and eighty-two (14,782).

There have been eighty leaks repaired, the cause of which was as follows: Twenty-three defective joints, twenty-four defective stops, fifteen defective pipes, two defective valves for fountains, six sewer trenches, one area wall settlement, four trench settlements, four drill holes, and one by electric pole being placed over pipe.

There was not a frozen pipe reported to the department during the year except in two instances, and that was where the pipe had been exposed by a sewer trench excavation. This is rather an unusual occurrence, in view of the fact that during the years 1893, 1894, and 1895 there had been reported a total of four hundred and fifty-four (454) frozen pipes. This can be attributed mostly to the fact of a period of severe cold weather coming before there had been any snow.

The following table shows the condition of the temperature, during the winter months, for the years 1893, 1894, and 1895 and up to Jan. 1, 1897. Period of winter months for which a comparison is made being for the months of November, December, January, February, and March of each year, except for 1896, which is only taken up to Jan. 1, 1897:

YEAR.	Average Maximum Tempera- ture.	Average Minimum Tempera- ture.	Average Mean Tempera- ture.	Minimum Tempera- ture.	No. of Serv- ices Frozen.
1893.....	28.5	11.9	20.5	.26	259
1894.....	28.2	11.5	19.9	.25	23
1895.....	30.9	14.3	22.6	.26	172
1896.....	29.5	15.6	22.6	.18	0

GENERAL MAINTENANCE AND EXTENSION ACCOUNT, FOR WORK  
DONE AND UNDER WAY OUTSIDE OF THE CITY LIMITS IN RAMSEY  
AND ANOKA COUNTIES.

Vadnais lake conduit has been flushed out three times the past year, and when last cleaned (which was in the month of November) it was found to be in a very favorable condition.

This condition of the conduit I attribute to the action of the artesian well water, pumped in at Vadnais lake, which has had the effect of reducing the temperature of the water in the conduit, thereby destroying to a very large extent the organic vegetable matter that would otherwise germinate and grow in the conduit, as ordinarily the temperature of the water when all taken direct from the lake increases about ten degrees during the summer months, from the time it enters the conduit at Vadnais lake until it reaches the terminal chamber at the McCarron lake station.

During the year the Vadnais lake pump house (also, the gate house that is situated south of intake chamber) was raised, and stone foundation piers were put in and pump house building painted. The grounds around the dwelling were surfaced with black earth, grass seed sown, and fenced, incurring an expense of about \$400.

The Baldwin lake canal discharging into Charles lake and the one from Pleasant lake to the north end of Wilkinson lake were cleaned out twice, and repairs done on woodwork where required. The Baldwin lake canal where curbed up with timber is fast decaying, and within the next two years it will be necessary to retimber it, if it is the desire of the board to keep it open. That part of the Centerville extension which consists of the laying of a thirty-six inch castiron pipe out into Centerville lake, for an intake, is now under way, and about 500 feet has been laid, leaving 400 feet yet to be put in. The city engineer, under whose direction the latter piece of work is being done, will report to you in detail all matters relating to this extension. I respectfully offer for your consideration the following suggestions in relation to matters pertaining to the department:

First—To omit in the annual report of the department all detail tables about sprinkling hydrants, fire hydrants, location and size of all valves. But the number put in each year, with a summary of the total, could be mentioned briefly, which would give in the aggregate what the water board has done each year, and what works and property it has charge and supervision of.

If, in your opinion, you thought it not advisable to omit these tables entirely, then for the purpose of having them in printed form, I would suggest that they be printed every third year, as the probable future extensions of the department for that period would be sufficient to warrant the expense of printing.

The annual report of 1895 contains about 147 pages, sixty-four of which are filled with these detail tables which are repeated year after year.

I am informed by the secretary that the average cost per copy of the annual report for the past three years was about one dollar each. Therefore, you can readily see what amount would be saved by eliminating them from the report.

Second—The placing of some employes on the pay roll on monthly wages instead of by the day.

Third—In view of the Centerville extension being practically completed, I would suggest that the telephone service should be put in the coming season, and the contract for furnishing poles be let as soon as practicable so that the service be completed by June 1st. And from the current price of the material and labor required to furnish and erect this line, I have made an approximate estimate of cost, and find that it would be about \$110 per mile. This includes everything except the telephone instruments. No doubt competition, if proposals were asked, would reduce this estimate.

Fourth—I would recommend the laying of another main across the river to supply the Sixth ward. This ward has a population of about 12,000 people who are depending on water from the sixteen-inch main, and in the event of a break the entire ward would be without fire protection, besides which domestic service would be discommoded during the time of making the repair. In the event that you should decide to lay an additional pipe across the river, the most propitious time to do this work would be this winter.

In conclusion, I wish to express my thanks for the courtesy and assistance tendered me in the performance of my duty by your honorable board.

Respectfully submitted,

A. R. STARKEY,  
Superintendent.



## PIPE LAID IN HIGH SERVICE DURING THE YEAR 1896.

DATE.	STREET.	FROM STREET TO STREET.	4-in.	6-in.	12-in.	20-in.	36-in.
July 20.....	Dawson.....	Forest to Cypress.....	.....	715	.....	.....	.....
May 2.....	Phalen ave..	Stillwater, 48 feet east.....	.....	.....	48	.....	.....
June 23.....	Floral.....	Oakland, 38 feet north.....	38	.....	.....	.....	.....
June 22.....	Dayton.....	West Third to Summit.....	192	.....	.....	.....	.....
July 15.....	Mulberry.....	West Sixth, 70 feet west.....	70	.....	.....	.....	.....
July 15.....	W. Sixth.....	College to Summit.....	.....	525	.....	.....	.....
Aug. 1.....	Sims.....	Earl to Cypress.....	.....	617	.....	.....	.....
Aug. 8.....	Geranium.....	Burr to Jessie.....	.....	616	.....	.....	.....
Aug. 14.....	Westminster	Cayuga to Lookout Place.....	.....	615	.....	.....	.....
Aug. 18.....	Agate.....	Poplar to York.....	.....	378	.....	.....	.....
Aug. 19.....	Agate.....	Case to Jenks.....	.....	320	.....	.....	.....
Aug. 26.....	Park ave.....	Cook to Lawson.....	.....	355	.....	.....	.....
Oct. 1.....	Marshall.....	Snelling to Wheeler ave.....	.....	.....	2,001.7	.....	.....
Oct. 22.....	Grand.....	Fairview to Baldwin.....	.....	771	.....	.....	.....
Oct. 26.....	Jessamine.....	Forest to Cypress.....	.....	644	.....	.....	.....
Nov. 4.....	Lawson.....	Cortland to Agate.....	.....	520	.....	.....	.....
July 29.....	Sixth.....	Summit to 12 feet west.....	.....	12	.....	.....	.....
McCarron La	ke Road Force	main.....	.....	.....	.....	.....	46
McCarron La	ke Road Force	main for connecting with	.....	.....	.....	.....	7,553
Dale street	main.....	.....	.....	.....	.....	.....	.....
Total .....			300	6,068	2,049.7	46	7,353

Total 4-inch pipe..... 300  
 Total 6-inch pipe..... 6,068  
 Total 12-inch pipe..... 2,049.7  
 Total 20-inch pipe..... 46  
 Total 36-inch pipe..... 7,353

Total in high service..... 15,816.7, or 2.9959 miles.

## PIPE LAID IN LOW SERVICE DURING THE YEAR 1896.

DATE.	STREET.	FROM STREET TO STREET.	4-in.	6 in.	3-in.
Dec. 14, 1895..	Sixth .....	St. Peter East.....	.....	.....	195
Jan. 25, 1896..	Cedar .....	Second to Third.....	.....	.....	176
July 17, 1896..	Duke .....	Seventh to St. Clair.....	.....	835.6	.....
Sept. 5, 1896..	Oneida .....	Jefferson to Grace.....	.....	598	.....
Aug. 31, 1896..	Ontario .....	Washington to a point 37 feet south of Hill street..	112	.....	.....
Total .....			112	1,433.6	371

Total 4-inch pipe..... 112  
 Total 6-inch pipe..... 1,433.6  
 Total 8-inch pipe..... 371

Total ..... 1,916.6 on low service.

## PIPE LAID ON WEST SIDE HIGH SERVICE DURING THE YEAR 1896.

DATE.	STREET.	FROM STREET TO STREET.	6-in.	12-in.
July 23.....	Robie.....	Bidwell to Bellows.....	522	.....
July 23.....	Bidwell.....	George to Robie.....	.....	314
July 28.....	Hall avenue.....	Elizabeth to Louisa.....	311	.....
July 29.....	Alice.....	Ohio to the park.....	141	.....
July 29.....	Ohio.....	Alice street East.....	4½	.....
Total.....			978½	314

Total 6-inch pipe..... 978½ feet.  
 Total 12-inch pipe..... 314

Total .....1,292½

## PIPE RELAID ON LOW SERVICE DURING THE YEAR 1896.

DATE.	STREET.	FROM STREET TO STREET.	6-in.	8-in.	12-in.
Dec. 7, 1895..	Fifth ...	Cedar to Wabasha, 4-inch, relaid with .....	.....	.....	249
Dec. 14, 1895..	Sixth ...	Wabasha to St. Peter, 4-inch, relaid with .....	.....	161	.....
Dec. 21, 1895..	Fifth ...	St. Peter to Washington, 4-inch, relaid with.....	506	.....	.....
July 1, 1896..	Sixth ...	Wacouta to Broadway, 4-inch, relaid with .....	.....	550	.....
July 1, 1896..	Sixth ...	Broadway to Pine, 4-inch, relaid with .....	.....	42	.....
Totals .....			506	753	249

Total relaid..... 1,508 feet.

## SUMMARY OF WATER PIPE LAID IN THE CITY OF ST. PAUL, JAN. 1, 1897.

	4-Inch.	6-Inch.	8-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.	Total Feet.	Total Miles.
High service....	37,423	542,479	.....	120,499	87,188	36,224	15,495	9,234	8,913	857,455	162.3967
Low service.....	41,164	197,245	3,411	47,997	38,078	8,302	8,765	16,436	18	361,416	68.4500
West Side high service.....	.....	23,030	.....	7,219	3,950	.....	.....	.....	.....	34,199	6.4771
Total. ....	78,587	762,754	3,411	175,715	129,216	44,526	24,260	25,670	8,931	1,253,070	237.3238

Total 4-inch pipe..... 78,587  
 Total 6-inch pipe..... 762,754  
 Total 8-inch pipe..... 3,411  
 Total 12-inch pipe..... 175,715  
 Total 16-inch pipe..... 129,216  
 Total 20-inch pipe..... 44,526  
 Total 24-inch pipe..... 24,260  
 Total 30-inch pipe..... 25,670  
 Total 36-inch pipe..... 8,931

Grand total.....1,253,070 feet, or 237.3238 miles.

## HYDRANTS PLACED IN 1896.

No.	LOCATION.	Service.	Single or Double Steamer.	Size of Pipe.	Pressure on Hydrants.
2201	Wabasha, bet. Fifth and Sixth, w. side...	Low.....	Double...	6	.....
2202	Sixth, bet. Wabasha and St. Peter, s. side	Low.....	Double...	8	.....
2203	Fifth and Market, 5, e. cor.....	Low.....	Double...	6	.....
2204	Cedar and Second, 22, w. cor.....	Low.....	Double...	8	.....
2205	West Third, 65 ft. s. of Summit, e. side..	High.....	Single...	6	.....
2206	Oakland and Floral, n. w. cor.....	High.....	Single...	4	.....
2207	Summit, 325 ft. e. of Sixth, n. side.....	High.....	Double...	12	.....
2208	Sixth and Summit, s. e. cor.....	High.....	Double...	6	.....
2209	Duke and Grace, n. w. cor.....	Low.....	Single...	6	.....
2210	Duke and St. Clair, s. w. cor.....	Low.....	Single...	6	.....
2211	Robie and Bellows, n. e. cor., West Side..	High.....	Single...	6	.....
2212	Robie and Bidwell, n. w. cor., West Side..	High.....	Single...	6	.....
2213	Louisa and Hall, s. w. cor., West Side....	High.....	Single...	6	.....
2214	Sims and Cypress, n. e. cor.....	High.....	Single...	6	.....
2215	Arcade, 154.5 ft. s. of Wells, e. side.....	High.....	Double...	12	.....
2216	Forest, 180 ft. s. of Wells, e. side.....	High.....	Double...	6	.....
2217	Geranium and Bradley, n. e. cor.....	High.....	Single...	6	.....
2218	Geranium and Burr, n. e. cor.....	High.....	Single...	6	.....
2219	Westminster and Cayuga, n. w. cor.....	High.....	Single...	6	.....
2220	Westminster and York, s. w. cor.....	High.....	Single...	6	.....
2221	Agate and Case, n. w. cor.....	High.....	Single...	6	.....
2222	Bohn's factory, 215 ft. e. of Arcade, 357 ft. s. of Wells.....	Low.....	Double...	16	.....
2223	Bohn's factory, 208 ft. e. of Arcade, 380 ft. s. of Wells.....	Low.....	Double...	16	.....
2224	Bohn's factory, 50 ft. w. of Mendota, 320 ft. s. of Wells.....	Low.....	Double...	16	.....
2225	Marshall and Fry, n. w. cor.....	High.....	Single...	12	.....
2226	Marshall and Pierce, n. w. cor.....	High.....	Single...	12	.....
2227	Marshall and Aldin, n. w. cor.....	High.....	Single...	12	.....
2228	Marshall and Herschel, n. w. cor.....	High.....	Single...	12	.....
2229	Grand and Fairview, n. e. cor.....	High.....	Single...	6	.....
2230	Jessamine and Cypress, n. w. cor.....	High.....	Single...	6	.....
2231	Lawson and Agate, n. w. cor.....	High.....	Single...	6	.....
2232	Oneida and Grace, s. w. cor.....	Low.....	Single...	6	.....

New hydrants placed during the year 1896 on high service..... 19  
 New hydrants placed during the year 1896 on low service..... 10  
 New hydrants placed during the year 1896 on West Side high service..... 3

Total for the year..... 32

DISTRICT.	Double Steamer.	Single Steamer.	Total No. of Hydrants in Each District.
High service.....	11	1,361	1,372
Low service.....	130	639	769
West Side high service.....	...	91	91
Total number double steamers up to date.....	141		
Total number of single steamers.....		2,091	
Total number of hydrants up to date.....			2,232

Hydrants Nos. 205-744 and 1561 were changed from single to double steamers.

The number and location of the following hydrants are placed on private property. They are of the standard make, and can be used in case of fire; Northwestern Cordage Works, 4; W. A. Wood Harvester Works, 11; Northern Pacific shops, 3; Yoerg's Brewery, 1.

## STREET SPRINKLING HYDRANTS PLACED IN 1896.

No.	LOCATION.	Measurement of Valve From Hydrant.
279	Maria and North.....	12 feet.
280	Hall and Winifred.....	11 feet.
281	Thomas and Farrington.....	7 feet.
282	Margaret and Cable.....	29 feet.
283	Mendota and Forest.....	9 feet.

No. 181 has been changed to St. Albans and Fairmount.  
 Number placed this year..... 5  
 Total placed to date..... 283

## VALVES PLACED IN 1896.

STRETT.	LOCATION.	4-in.	6-in.	8-in.	12-in.	20-in.	36-in.
Arcade.....	154.5 feet s. of Wells on H.....	1					
College.....	West line of Sixth.....	1					
Dawson.....	East line of Earl.....	1					
Forest.....	180 feet s. of Wells on H.....	1					
Forcemain.....	On McCarron road, B. W. and B. O....	3	2			3	3
Grand.....	East line of Fairview.....	1					
Jessamine.....	East line of Forest.....	1					
Lawson.....	East line of Courtland.....	1					
Marshall.....	West line of Snelling.....				1		
Marshall.....	West line of Aldine.....				1		
Mulberry.....	West line of Sixth.....		1		1		
Sims.....	West line of Earl.....		1				
Sixth.....	North line of Summit.....		1				
Summit.....	19 feet east of Dayton.....	1					
Westminster.....	South line of York.....		1				
Bohn's Factory	In lumber yard on H.....		3				
Cedar.....	South line of Third.....		1	1			
Duke.....	North line of Seventh.....		1				
Fifth.....	West line of Market.....		1				
Oneida.....	North line of Jefferson.....		1				
Ontario.....	43 feet east of west line of Washington	1					
Rosabel.....	South line of Sixth.....		1				
Robie.....	West line of Bidwell.....		1				
Total .....		2	23	3	2	3	3

Total West Side high service..... 1

Total low service ..... 9

Total high service ..... 26

Total ..... 36

## TOTAL NUMBER OF VALVES ON ALL SYSTEMS, JAN. 1, 1897.

Sizes in Inches.	High Service.	Low Service.	West Side High Service.	Total.
3 inches.....	23	15		38
4 inches.....	110	128		238
6 inches.....	901	442	38	1,381
8 inches.....	2	13	8	23
12 inches.....	136	66		202
16 inches.....	66	35	5	106
20 inches.....	33	10		43
24 inches.....	9	4		13
30 inches.....	4	5		9
36 inches.....	5	1		6
Total .....	1,289	719	51	2,059





## WATER MAINS ON LOW SERVICE.—Continued.

STREET.	FROM STREET TO STREET.	4 Inch.	6 Inch.	8 Inch.	12 Inch.	16 Inch.	20 Inch.	24 Inch.	30 Inch.	36 Inch.
Fred.....	300 feet east of Burr.....	337								
Garfield.....	Ramsey to Goodrich.....		1002							
Goodhue.....	Cliff to Duke.....		2817							
Goodrich.....	Milwaukee Short Line to Richmond.....		1260		1733					
Grace.....	Seventh to Colborne.....		72							
Grove.....	Monroe to Jackson.....	133	1310				1544			
Glencoe.....	Mississippi to Columbia.....		592							
George.....	State to Stryker.....				2625					
Goff.....	Wabasha to Winifred.....		105							
Greenwood.....	Winifred to Congress.....		305							
Harrison.....	Douglas to Lawton.....		1971							
Hopkins.....	De Soto to Bradley.....		700							
Hall.....	George to Prospect Ter.....		2080							
Indiana.....	State to Ethel.....				2432	2242				
Isabel.....	State to Charlton.....				5055					
Jackson.....	Levee to University.....	40	1223		3179		108			
Jefferson.....	Erie to Arbor.....		63		1171					
James.....	Seventh to Warsaw.....		445							
Jessie.....	Minnehaha to Fauquier.....		634							
John.....	Third to Williams.....	895	2443							
Juno.....	View to Chatsworth.....		2130							
Kittson.....	Fourth to Seventh.....		846							
Kentucky.....	Crossing State.....		55							
Lafayette.....	Grove to De Soto.....				150	1915				
Lee ave.....	Seventh to Drake.....		1445							
Leech.....	Goodrich to Ramsey.....		1146							
Levee.....	Sibley to Jackson.....	340								
Locust.....	Seventh to Grove.....					777	248			
L'Orient.....	Thirteenth to Minnehaha.....		2209							
Livingston.....	Delos to Wood.....		580							
Lisbon.....	Douglas to Pleasant.....		973							
Logan.....	Bay to Canton.....		814							
Louisa.....	Robert to Gorman.....		701							
McBoal.....	Wilkin to Douglas.....		1301							
Magnolia.....	Crossing Mississippi.....		18							
Market.....	Third to Fourth.....	250								
Minnehaha.....	Payne to Rivoli.....		1707							
Minnesota.....	Third to Twelfth.....	1484	1428							
Mississippi.....	Grove to Overton Ave.....		5165						8013	
Monroe Pl.....	Grove to Woodward.....	300								
Mt. Airy.....	Mississippi to L'Orient.....		330							
Michigan.....	Crossing Seventh.....		59							
Mayall a'y.....	Seventh to Ninth.....	410								
Midway.....	Oakdale to Brown.....		1847							
Nash.....	Pine to L'Orient.....		698							
Neill.....	Seventh to Eighth.....	325								
Ninth.....	Neill to Smith Ave.....	975	5187							
Norris.....	Canada to Temperance.....	761								
North.....	Bedford to De Soto.....		851							
Nugent.....	St. Clair to C., M. & St. P. Short Line.....		513							
Olive.....	Sixth to Olmsted.....	236								
Olmsted.....	John to Pine.....		651							
Oneida.....	Grace to 36 feet south of Seventh.....		634							
Ontario.....	Washington to Spring.....	112								
Oakdale.....	State to Midway.....		326			350				
Overton Av.....	Mississippi to terminal chamber.....								8423	18
Patridge.....	Bradley to De Soto.....	472								
Pine.....	Seventh to Olmsted.....	1275	965							
Plato.....	West of South Robert.....		18							
Pleasant.....	Sixth to Goodrich.....		4884							
Prince.....	John to Broadway.....		825							
Payne.....	Beaumont to Omaha Ry.....		1092							
Pennsylv'a.....	Mississippi to Columbia.....		661							
Preble.....	Beaumont to Minnehaha.....		471							
Prescott.....	Oakdale to Woodbury.....		1365							
Ramsey.....	Seventh to Pleasant.....		1352			307				
Randolph.....	Webster to Milton.....		757		2818					
Richmond.....	Seventh and Goodrich.....		90							



## WATER MAINS ON LOW SERVICE.—Continued.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	8-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Winslow....	Isabel to Prospect Ter....	.....	745	.....	.....	.....	.....	.....	.....	.....
Yankee.....	Seventh to Dousman.....	678	.....	.....	.....	.....	.....	.....	.....	.....
Main old line.....	Fauquier to Lake Phalen	.....	.....	.....	.....	6000	.....	7024	.....	.....
	Total .....	41164	197245	3411	47997	38078	8302	8765	16436	18

		Feet.
Total	4-inch pipe.....	41,164
Total	6-inch pipe.....	197,245
Total	8-inch pipe.....	3,411
Total	12-inch pipe.....	47,997
Total	16-inch pipe.....	38,078
Total	20-inch pipe.....	8,302
Total	24-inch pipe.....	8,765
Total	30-inch pipe.....	16,436
Total	36-inch pipe.....	18

Total ..... 361,416 feet, or 68.45 miles.

LOCATION, SIZE AND NUMBER OF FEET OF WATER MAINS LAID ON  
HIGH SERVICE TO JAN. 1, 1897.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Arlington...	Greenbrier to Payne.....	650	.....	.....	.....	.....	.....	.....	.....
Arundel...	Summit to Lafond.....	2553	.....	.....	.....	.....	.....	.....	.....
Ashland...	Western to Oxford.....	.....	7203	.....	.....	.....	.....	.....	.....
Aurora...	Robert to Chatsworth.....	.....	7814	.....	.....	.....	.....	.....	.....
Arcade...	Third to Rose.....	.....	1070	5382	.....	.....	.....	.....	.....
Astoria...	St. Anth'ny to Milwaukee.....	.....	275	.....	.....	.....	.....	.....	.....
Argyle...	Front to Van Slyke.....	370	831	.....	.....	.....	.....	.....	.....
Albemarle...	Atwater to Front.....	1293	.....	.....	.....	.....	.....	.....	.....
Arch.....	100 feet west of Columbia to Jackson.....	.....	1725	.....	.....	.....	.....	.....	.....
Atlantic...	Fauquier to Stillwater.....	.....	1785	.....	.....	.....	.....	.....	.....
Atwater...	Rice to Sylvan.....	.....	1142	.....	.....	.....	.....	.....	.....
Agate...	Cortland to Jenks.....	.....	2437	.....	.....	.....	.....	.....	.....
Avon.....	Dayton to Martin.....	1381	.....	.....	.....	.....	.....	.....	.....
Bates.....	Murray to Hastings.....	.....	376	3035	.....	.....	.....	.....	.....
Beech.....	Seventh to Duluth.....	.....	3738	.....	.....	.....	.....	.....	.....
Blair.....	Western to Fairview.....	.....	4610	.....	.....	.....	.....	.....	.....
Broadway...	Thirteenth to Mt. Airy.....	.....	407	.....	533	.....	.....	.....	.....
Brewster...	University to Como.....	.....	1076	.....	.....	.....	.....	.....	.....
Burr.....	C., St. P. M. & O. R. R. to Brainerd.....	.....	3498	.....	.....	.....	.....	.....	.....
Bradford...	Hampden to Endicott.....	.....	819	.....	.....	.....	.....	.....	.....
Bradley...	Maryland to 236 feet of.....	.....	256	.....	.....	.....	.....	.....	.....
Burgess...	At Dale and at Como.....	.....	114	.....	.....	.....	.....	.....	.....
Bayless Av.	Raymond to Langford P.....	.....	.....	.....	2935	.....	.....	.....	.....
Bayless Pl.	Raymond to Bayless Ave.....	902	.....	.....	.....	.....	.....	.....	.....
Burns.....	Mound to Griffith.....	.....	2753	.....	.....	.....	.....	.....	.....
Blake.....	Raymond to Langford P. P. E.....	.....	282	.....	186	.....	.....	.....	.....
Beacon.....	University to Shields.....	594	.....	.....	.....	.....	.....	.....	.....
Buffalo...	Capitol to Genesee.....	.....	631	.....	.....	.....	.....	.....	.....
Canada.....	University to Valley.....	.....	290	.....	.....	.....	.....	.....	.....
Capitol...	Mississippi to Fairview.....	.....	6866	.....	.....	.....	.....	.....	.....
Carroll...	Rice to Cleveland.....	.....	13202	.....	.....	.....	.....	.....	.....
Conway...	Cypress to Maria.....	.....	3067	.....	.....	.....	.....	.....	.....
Cedar.....	Summit to Como.....	.....	2486	.....	.....	.....	.....	.....	.....
Central Av..	East line of Central Park to Rice.....	557	1254	.....	.....	.....	.....	.....	.....
Central P.D. E. & W...	Summit to Central Ave..	1209	.....	.....	.....	.....	.....	.....	.....
Charles...	Rice to Prior.....	.....	10171	.....	.....	.....	.....	.....	.....
Churchill...	Front to Van Slyke.....	1103	1263	.....	.....	.....	.....	.....	.....
College...	Rice to Third.....	.....	1165	.....	.....	.....	.....	.....	.....
Como Boul..	East line of lot 4, block 5, to north line of lot 5, block 1, Warrendale.....	.....	666	.....	.....	.....	.....	.....	.....
Como Av....	Park to Dale.....	.....	.....	.....	469	6555	.....	.....	.....
Chelton...	Prior to Tatum.....	.....	559	.....	.....	.....	.....	.....	.....
Cherry.....	267 feet west of Hoffman to Maria.....	267	565	.....	.....	.....	.....	.....	.....
Cook.....	Forrest to Rice.....	.....	6123	.....	.....	.....	.....	.....	.....
Case.....	Forrest to Terrace.....	.....	345	6551	.....	.....	.....	.....	.....
Claghorn...	Lafond to Van Buren.....	.....	628	.....	.....	.....	.....	.....	.....
Cypress...	North of Euclid.....	45	.....	.....	.....	.....	.....	.....	.....
Cromwell...	Manvel to Cudworth.....	.....	1599	.....	.....	.....	.....	.....	.....
Cudworth...	Bayless to Eustis.....	.....	985	.....	.....	.....	.....	.....	.....
Clark.....	Whitall to Case.....	.....	1308	.....	.....	.....	.....	.....	.....
Cross.....	Argyle to Lexington.....	.....	966	.....	.....	.....	.....	.....	.....
Cambridge...	Princeton to Lincoln.....	.....	1060	.....	.....	.....	.....	.....	.....
County Rd.	Langford to Dooley.....	.....	.....	.....	256	.....	.....	.....	.....
Crocus Pl...	Goodrich to Fairmount.....	1314	.....	.....	.....	.....	.....	.....	.....
Chatsw'th...	Evergreen to Van Slyke.....	.....	983	.....	.....	.....	.....	.....	.....
Cleveland...	Lincoln to University.....	.....	.....	3411	3313	.....	.....	.....	.....
Cortland...	Capitol to Maryland.....	.....	252	.....	4600	.....	.....	.....	.....
Cayuga.....	Mississippi to Cortland.....	.....	1630	.....	.....	.....	.....	.....	.....
Carter.....	West line lot 31, block 40, to County road.....	.....	1886	.....	.....	.....	.....	.....	.....
Dale.....	Fairmount to Reservoir.....	4800	.....	2110	5280	1453	14500	9234	1560
Dayton.....	Third to Cleveland.....	192	11573	4675	.....	.....	.....	.....	.....



## WATER MAINS ON HIGH SERVICE.—Continued.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Duluth.....	Seventh to Omaha Ry....	.....	434	.....	.....	.....	.....	.....	.....
Dayton Pl....	West to Maria.....	275	.....	.....	.....	.....	.....	.....	.....
De Soto.....	Mt. Ida to Lawson.....	.....	3510	.....	.....	.....	.....	.....	.....
Dawson.....	Arcade to Gotzian.....	.....	3673	.....	.....	.....	.....	.....	.....
Dooley.....	County road to 15 feet east of Raymond.....	.....	1327	.....	.....	.....	.....	.....	.....
Earl.....	Burns to Cook.....	.....	.....	3593	2291	.....	.....	.....	.....
Edmund.....	Rice to Milton.....	.....	8518	.....	.....	.....	.....	.....	.....
Elchenwald....	Sixth to Seventh.....	.....	532	.....	.....	.....	.....	.....	.....
Euclid.....	Maple to Earl.....	.....	2391	.....	.....	.....	.....	.....	.....
Elfelt.....	Charles to Blair.....	1054	.....	.....	.....	.....	.....	.....	.....
Edgerton.....	York to Maryland.....	.....	.....	4272	.....	.....	.....	.....	.....
Everett Ct....	Wheeler to Great North- ern Ry.....	.....	355	.....	.....	.....	.....	.....	.....
Evergreen.....	Victoria to Lexington....	.....	1876	.....	.....	.....	.....	.....	.....
Ellis.....	Raymond to Seal.....	.....	377	.....	.....	.....	.....	.....	.....
Farrington....	Summit to Lafond.....	.....	3459	.....	.....	.....	.....	.....	.....
Fauquier.....	290 feet east of Atlantic to Greenbrier.....	.....	6153	.....	.....	.....	.....	.....	.....
Fuller.....	Rice to 200 feet west of Oxford.....	.....	8092	.....	.....	.....	.....	.....	.....
Fifth.....	125 feet east of Hoffman to Maple.....	.....	1543	.....	.....	.....	.....	.....	.....
Floral.....	Summit to Oakland.....	518	.....	.....	.....	.....	.....	.....	.....
Fourth.....	Terry to 400 feet west of Maria.....	.....	5342	.....	.....	.....	.....	.....	.....
Francis.....	Arcade to Cypress.....	.....	1264	.....	.....	.....	.....	.....	.....
Front.....	Sylvan to Lexington.....	.....	1140	10475	12	12	.....	.....	.....
Forest.....	Conway to Geranium.....	.....	3113	.....	.....	.....	.....	.....	.....
Fairmount....	Dale to Milton.....	.....	2931	518	.....	.....	.....	.....	.....
Fairview St..	Valley to 200 feet north of Mt. Airy.....	.....	378	.....	.....	.....	.....	.....	.....
Feronia.....	Fairview to Prior.....	.....	1378	.....	.....	.....	.....	.....	.....
Freemont.....	Earl to Arcade.....	.....	2577	.....	.....	.....	.....	.....	.....
Fairview Av..	Selby to Capitol.....	.....	.....	2542	1971	.....	.....	.....	.....
Fry.....	Territorial road to Capi- tol.....	1087	6	.....	.....	.....	.....	.....	.....
Force Main..	Pump house to reservoir..	.....	.....	.....	7886	70	.....	7353	.....
Flandrau.....	Harvester to Stillwater..	.....	595	.....	.....	.....	.....	.....	.....
Grand.....	Lawton to Cretin.....	.....	8865	.....	.....	.....	.....	.....	.....
Grove.....	Seventh to Pine.....	.....	.....	2618	.....	.....	.....	.....	.....
Giotto.....	Lincoln to Lafond.....	.....	4594	.....	.....	.....	.....	.....	.....
Goodrich.....	782 feet east of Dale to Oxford.....	.....	5358	.....	.....	.....	.....	.....	.....
Greenbrier....	Seventh to Magnolia.....	512	.....	650	.....	.....	.....	.....	.....
Gaultier.....	Sherburne to Cook.....	.....	2730	.....	.....	.....	.....	.....	.....
Gordon.....	Raymond to Carter.....	.....	1387	693	.....	.....	.....	.....	.....
Geranium.....	Arcade to Burr.....	.....	1919	.....	.....	.....	.....	.....	.....
Gennessee....	Mississippi to Buffalo....	.....	814	.....	.....	.....	.....	.....	.....
Granite.....	Mississippi to Courtland..	.....	1622	.....	.....	.....	.....	.....	.....
Hoffman.....	Clearmont to Seventh.....	.....	2946	.....	.....	.....	.....	.....	.....
Holly.....	Western to Victoria.....	.....	5287	.....	.....	.....	.....	.....	.....
Hague.....	Dale to Griggs.....	.....	6512	.....	.....	.....	.....	.....	.....
Hudson.....	Cypress to Maria.....	.....	2389	194	.....	.....	.....	.....	.....
Hastings.....	Bates to Hester.....	.....	.....	3066	.....	.....	.....	.....	.....
Hewitt.....	Aldine to Syndicate.....	.....	4541	.....	.....	.....	.....	.....	.....
Hope.....	Fourth to Seventh.....	.....	1156	.....	.....	.....	.....	.....	.....
Hamden.....	Raymond to Hersey.....	.....	1691	.....	.....	.....	.....	.....	.....
Harvester....	White Bear to Hazel.....	.....	.....	1306	.....	.....	.....	.....	.....
Hazel.....	Harvester to 300 feet north of Ames.....	.....	.....	980	.....	.....	.....	.....	.....
Horton.....	Van Slyke to Como Bou- levard.....	.....	419	.....	.....	.....	.....	.....	.....
Hardenburg place.....	Lytton place to Atwater....	349	.....	.....	.....	.....	.....	.....	.....
Iglehart.....	Wabasha to Cleveland....	.....	14706	.....	.....	.....	.....	.....	.....
Jackson.....	Viola to Sycamore.....	.....	236	2237	145	.....	.....	.....	.....
Jay.....	St. Anthony to Fuller.....	.....	656	.....	.....	.....	.....	.....	.....
Jenks.....	Forrest to Courtland.....	.....	6084	.....	.....	.....	.....	.....	.....
Jessamine....	Rice to Cypress.....	.....	8830	.....	.....	.....	.....	.....	.....





## WATER MAINS ON HIGH SERVICE.—Continued.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Park Ave....	Martin to Cook.....		1771						
Princeton....	Macalester to Baldwin...		1399						
Pine.....	Grove to Pennsylvania....		1820		387				
Portland....	Summit to Victoria.....		5290						
Pennsylv'ia...	Olive to Pine.....	505	342						
Plum.....	Maple to Hoffman.....		1150						
Prior.....	Selby to University.....		804	3447					
Payne.....	Omaha Ry. to Ivy.....		5629						
Pascal.....	Minnehaha to Taylor....		1743						
Pym.....	Bayless to Eustis.....			736					
Priscilla....	Raymond avenue E.....		542						
Pratt.....	Raymond to Gibbs.....		762						
Phalen.....	Seventh to Stillwater....			1467					
Pacific.....	Cypress to Hester.....		1260						
Pleasant....	Osceola to St. Albans....			569					
Poplar.....	N. P. R. R. yard to Cort- land.....		889						
Rice.....	College to Jessamine....		495	2147	5990	1154			
Robert.....	171 ft. south of University to 254 north of same....		425						
Rondo.....	Rice to Terrace Park Ave.		10061						
Reaney.....	English to Greenbrier....		6448						
Ramsey.....	Oakland to Summit.....		1259						
Ross.....	Atlantic to Seventh....		2467						
Ravoux.....	Rondo to Fuller.....	616							
River.....	Maria to Hoffman.....	559							
Ravine.....	Maple to 344 feet west of Maria.....	1423							
Raymond....	University to Langford av		3205		1588				
Robbins....	Bayless to Raymond P....		440						
Rose.....	Arcade to Edgerton.....		1497						
St. Anthony.	Rice to Cleveland.....		13893						
St. Peter....	College to University....		2557						
Selby Ave....	Summit to Prior.....		17002						
Seventh....	Grove to White Bear Ave.				15025				
Sherburne...	Jackson to Chatsworth....	400	10470						
Sinnen.....	Sixth to Seventh.....		541						
Suction main	Pump house to terminal....						925		
Summit Ave.	C. P. D. E. to Baldwin....	913	5481	13384					
Summit Pl...	Nelson to Fuller.....		2122						
St. Albans...	Pleasant to Martin.....	2366	300	556					
Sims.....	Edgerton to Earl.....		4539						
Sims.....	Forest to Edgerton.....		3922						
Summit Ct...	East of Lawton.....		362						
Short.....	Maria to Hoffman.....		591						
Snelling....	Goodrich to G. N. Ry....				11195				
Simpson....	Blair to Hewitt.....		1528						
Sixth.....	Hoffman to Arcade.....		2646						
Sixth.....	College to Summit.....		537						
Sidney.....	Raymond to Bradford....		610						
Scudder....	Blake to Langford Ave....				1347				
St. Clair....	Victoria to Oxford.....			1935					
Stinson....	Gaultier to Western....		1266						
Sycamore....	Rice to Courtland.....			2509					
Syndicate...	Lincoln to Summit.....		967						
Stillwater...	White Bear to Ames.....		906						
Tatum.....	Minnehaha to Chelton....		541						
Third.....	Cypress to Summit.....	367	4449						
Thirteenth...	Pine to Broadway.....				778				
Tilton.....	Wabasha to Rice.....		1278						
Thomas.....	Como to Chatsworth....		7605						
Topping....	At Como and at Dale....		118						
Taylor.....	Charlotte to Holton.....		2467						
Territorial road.....	Raymond to Eustis.....		1498						
University...	Broadway to Cromwell....		40	6387	3594	19164			
Valley.....	Broadway to Jackson....				1789				
Viola.....	Jackson to Rice.....		1653						
Victoria....	St. Clair to Lafond.....				9518				
Virginia....	Summit to Como.....	2432	1798						
Van Buren...	Western to Wheeler.....		6485						

## WATER MAINS ON HIGH SERVICE.—Continued.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Van Slyke...	Chatsworth to Lexington		1438						
Wabasha...	Summit to Park av.	537	842						
Western...	Summit to Como...			1775	6285				
Williams...	Olive to Mississippi.		857						
Waltham...	Laura to Prior...	559							
Wayzata...	At Albemarle...		90						
Wilder...	Iglehart to St. Ant..		1388						
Whitall...	Payne to Clark...		2301						
Walker...	Hewitt to Great Northern Ry...	867							
Wesley...	Pascal to Fry...	394	621						
Workhouse...	Around workhouse..		1043						
Wheeler St..	Bayless to Everett.			1012					
Westminster.	Cayuga to Case...		999						
Wheeler Av..	Univers'y to Shields		588						
Woodbridge.	Atwater to Front...		1297						
Winnipeg...	Rice to Sylvan...		1142						
Wells...	Edgerton to Arcade		1804						
Wells, south side.	From E. to W. end of retaining wall..	1130							
White Bear..	Seventh to Ames...			1992					
York...	Forrest to Cortland.		5782						
Total .....		37423	542479	120499	87188	36224	15495	9234	8913

	Feet.
Total 4-inch pipe.....	37,423
Total 6-inch pipe.....	542,479
Total 12-inch pipe.....	120,499
Total 16-inch pipe.....	87,188
Total 20-inch pipe.....	36,224
Total 24-inch pipe.....	15,495
Total 30-inch pipe.....	9,234
Total 36-inch pipe.....	8,913

Total ..... 857,455 feet, or 162.3967 miles.

LOCATION, SIZE AND NUMBER OF FEET OF WATER MAINS LAID ON  
HIGH SERVICE, WEST SIDE, TO JAN. 1, 1897.

STREET.	FROM STREET TO STREET.	6-Inch.	12-Inch.	16-Inch.
Annapolis...	At Manomin.....		100	
Alice.....	Ohio to the park.....	141		
Baker.....	Bidwell to Cherokee.....		3539	
Belvidere.....	South Robert to Oakdale.....	851		
Bidwell.....	Morton to Roble.....		346	362
Bunker.....	Oakdale to Brown.....	1808		
Curtice.....	Oakdale to 250 feet east of Woodbury.....	1437		
Cherokee.....	Annapolis to Smith.....	4241		
	From Annapolis to tank.....		100	
George.....	Stryker to 40 feet west of Manomin.....	3334		
Hall.....	Morton to Louisa.....	894		
Manomin.....	Baker to Annapolis.....		2540	
Morton.....	Robert to Bidwell.....			2672
Oakdale.....	Midway to Curtice.....	1319		
Ohio.....	Winona to Winifred.....	3485		
Orleans.....	Cherokee to Page.....	2517		
Page.....	Robert to Harvard.....	1344		170
Robie.....	Bidwell to Bellows.....	522		
Robert.....	Belvidere to Morton.....		594	606
State.....	Page to pump house.....			140
Stryker.....	Tyler to Augusta.....	791		
Sidney.....	Ottawa to Cherokee.....	346		
Total.....		23030	7219	3950

Total 6-inch pipe..... 23,030  
Total 12-inch pipe..... 7,219  
Total 16-inch pipe..... 3,950

Total ..... 34,199 feet, or 6.4771 miles.

RECAPITULATION OF THE TOTAL MILEAGE OF WATER PIPES IN THE  
CITY, JAN. 1, 1897.

Low service..... 361,416  
High service..... 857,455  
West Side high service..... 34,199

Total ..... 1,253,070 feet, or 237.3238 miles.

## INVENTORY OF STOCK AND TOOLS, JAN. 1, 1897.—PIPE SPECIALS

ETC.

345 feet 36-inch pipe (castiron).	1 24x50x20 Y.
228 feet 30-inch pipe (castiron).	1 20x20x20 Y.
96 feet 24-inch pipe (castiron).	1 20x16x16 Y.
156 feet 20-inch pipe (castiron).	1 12x12x12 Y.
62 feet 16-inch pipe (castiron).	1 20 to 12-inch reducer.
76 feet 12-inch pipe (castiron).	4 16 to 12-inch reducers.
115 feet 8-inch pipe (castiron).	8 12 to 6-inch reducers.
1458 feet 6-inch pipe (castiron).	1 8 to 6-inch reducer.
1210 feet 4-inch pipe (castiron).	2 6 to 4-inch reducers.
6 feet 3-inch pipe (castiron).	3 manhole frames.
4 pieces 36-inch curvature pipe.	9 manhole covers.
5 pieces 30-inch curvature pipe.	4 12x6-inch sleeves and gate, Smith patent.
5 pieces 24-inch curvature pipe.	3 8x6-inch sleeves and gate, Smith patent.
4 pieces 20-inch curvature pipe.	2 8x4-inch sleeves and gate, Smith patent.
2 pieces 16-inch curvature pipe.	4 6x6-inch sleeves and gate, Smith patent.
4 pieces 12-inch curvature pipe.	6 6x4-inch sleeves and gate, Smith patent.
1 piece 8-inch curvature pipe.	2 6x2-inch sleeves and gate, Smith patent.
32 pieces 6-inch curvature pipe.	1 4x2-inch sleeve and gate, Smith patent.
20 pieces 4-inch curvature pipe.	32 washers for open sleeve..
2 36-inch sleeves.	2180 pounds pig lead.
1 30-inch sleeve.	88 feet 8-inch pipe (wrought iron).
4 24-inch sleeves.	5 feet 6-inch pipe (wrought iron).
2 20-inch sleeves.	12 feet 4-inch pipe (wrought iron).
2 16-inch sleeves.	21 feet 3-inch pipe (wrought iron).
3 12-inch sleeves.	34 pounds hemp packing.
5 8-inch sleeves.	140 pounds yarn.
6 6-inch sleeves.	4 pounds oakum.
15 4-inch sleeves.	2 pounds resin.
1 30-inch open sleeve.	1 piece 36-foot pine pile.
1 24-inch open sleeve.	6 telephone poles.
1 20-inch open sleeve.	1600 bricks.
2 16-inch open sleeves.	9 cement tiles.
1 12-inch open sleeve.	3¾ barrels cement.
2 8-inch open sleeves.	1½ rolls tar paper.
3 6-inch open sleeves.	¾ barrel rock salt.
7 4-inch open sleeves.	50 pounds rivets.
1 6x6x6-inch open sleeve.	8 wire cable couplings.
2 36-inch plugs.	2 coils 1-inch wire rope.
1 24-inch plug.	¼ barrel black enamel paint.
4 20-inch plugs.	135 pounds 20-p. nails.
2 16-inch plugs.	52 pounds 8-p. nails.
11 12-inch plugs.	1 gallon linseed oil.
9 8-inch plugs.	11 pieces 8-inch earthenware pipe.
25 6-inch plugs.	1 60-gallon oil tank.
22 4-inch plugs.	1 lot old sheet iron.
1 30x6-inch 4-way branch.	1 lot old brass (365 lbs.)
1 24x12-inch 4-way branch.	23 pieces of sheeting, 2x8, 10 feet long.
1 24x6-inch 4-way branch.	37 pieces of sheeting, 2x10, 8½ feet average length.
2 24x4-inch 3-way branches.	9 pieces of sheeting, 2x12, 13½ feet average length.
1 16x16-inch 4-way branch.	1 piece of sheeting, 3x12, 8 feet long.
1 16x12-inch 4-way branch.	9 pieces of timber, 6x8, 14 feet average length.
1 16x12-inch 3-way branch.	2 pieces of timber, 6x12, 12 feet long.
1 16x6-inch 4-way branch.	2 pieces of timber, 8x10, 12 feet long.
1 16x6-inch 3-way branch.	2 pieces of timber, 10x12, 16 feet average length.
2 16x4-inch 3-way branches.	3 pieces of timber, 12x12, 8 feet average length.
1 16x3-inch 3-way branch.	1 piece oak timber, 6x6, 7 feet long.
1 12x12-inch 4-way branch.	
2 12x12-inch 3-way branches.	
3 12x6-inch 4-way branches.	
6 12x6-inch 3-way branches.	
1 12x4 4-way branch.	
1 12x4 3-way branch.	
1 8x6 4-way branch.	
3 8x6 3-way branches.	
3 8x4 3-way branches.	
11 6x6 4-way branches.	
15 6x4 4-way branches.	
1 6x4 3-way branch.	
6 6x3 3-way branches.	
7 4x4 4-way branches.	
16 4x4 3-way branches.	
2 4x3 3-way branches.	



## GATES AND GATE DUPLICATES

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1 20-inch gate, old.</li> <li>11 6-inch gates, Smith patent.</li> <li>8 4-inch gates, Smith patent.</li> <li>3 2-inch gates, Smith patent.</li> <li>3 6-inch gates for old cement main.</li> <li>4 6-inch gates.</li> <li>1 4-inch gate, Ludlow, old.</li> <li>4 4-inch gates, single-faced, old.</li> <li>3 4-inch gates.</li> <li>9 3-inch gates, old.</li> <li>9 gate wrenches.</li> <li>11 gate boxes, complete.</li> </ul> | <ul style="list-style-type: none"> <li>7 gate box center pieces.</li> <li>9 gate box cases.</li> <li>110 gate box covers.</li> <li>2 valve rods, 7 feet long.</li> <li>1 valve rod, 12 feet long, for air vents.</li> <li>1 valve rod, 18 feet long, for air vents.</li> <li>3 2-inch brass elbows for air vents.</li> <li>Miscellaneous lot of gate duplicates (spindles, etc.)</li> </ul> |
|--|---|

## HYDRANTS.

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>3 S. hydrants, for reserve.</li> <li>1 D. hydrant, for reserve.</li> <li>3 D. Mathew hydrants, complete.</li> <li>12 S. Mathew hydrants, complete.</li> <li>9 casings for sprinkling standpipes.</li> <li>3 casings for S. hydrants.</li> <li>2 casings for D. hydrants.</li> <li>21 caps for standpipe casings.</li> <li>10 bottom valves for D. hydrants.</li> <li>19 bottom valves for S. hydrants.</li> <li>33 nozzle caps (18 large, 15 small).</li> <li>21 nozzles (6 large, 15 small).</li> <li>11 cases for sprinkling standpipe casings</li> <li>5 pots for S. hydrants (2 6-inch, 3 4-inch).</li> <li>1 kit of tools for repairing hydrants.</li> <li>1 lot standard samples.</li> <li>22 hydrant wrenches.</li> <li>1 spanner.</li> <li>315 feet 2½-inch hose (thereof 14 pieces in 5-foot lengths, with nipples).</li> </ul> | <ul style="list-style-type: none"> <li>250 feet 2-inch hose for standpipes.</li> <li>76 feet ¾-inch hose for standpipes.</li> <li>1 pair hose clamp plyers.</li> <li>18 feet 2½-inch galvanized pipe.</li> <li>75 feet 2-inch galvanized pipe.</li> <li>200 feet 2-inch galvanized pipe.</li> <li>4 pairs 2½-inch hose couplings.</li> <li>3 2-inch hose nozzles.</li> <li>5 2-inch brass reducers, for hose couplings.</li> <li>12 rods for S. hydrants.</li> <li>5 rods for D. hydrants.</li> <li>2 boilers for thawing out frozen hydrants.</li> <li>Miscellaneous lot of hydrant duplicates.</li> <li>2 pairs plyers for sprinkling standpipe repairs.</li> <li>1 chain for hydrant repairs.</li> </ul> |
|---|---|

## PIPE-LAYING TOOLS.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1 work bench.</li> <li>3 tool boxes.</li> <li>2 lead ladles, 2 solder irons, 3 solder molds.</li> <li>3 lead pots, 1 6-inch chain tongs.</li> <li>3 lead furnaces.</li> <li>1 lead pot and furnace on wheels.</li> <li>2 iron plates for derrick drum.</li> <li>4 derricks (2 4-legged and 2 3-legged).</li> <li>1 derrick (2-legged) for tunnel use.</li> <li>1 Bagnall &amp; Land diaphragm pump.</li> <li>Miscellaneous extra pieces to diaphragm pump.</li> <li>1 force pump, 1-inch.</li> <li>1 drip pump, ½-inch.</li> <li>38 shovels.</li> <li>2 grubhoes.</li> <li>28 picks.</li> <li>10 sandrock picks.</li> <li>8 sledge hammers, 54 sledge handles.</li> <li>2 striking hammers.</li> <li>1 ball-faced hammer.</li> <li>2 crow bars.</li> <li>12 rock drills.</li> <li>1 electric battery for blasting rock.</li> <li>25 electric fuses.</li> <li>3 tamping bars for blasting.</li> <li>30 pieces blasting timbers.</li> <li>8 blasting chains.</li> <li>2 plug and feather drills.</li> </ul> | <ul style="list-style-type: none"> <li>2 castiron pipe cutters, for 4 to 12-inch pipe.</li> <li>1 pipe cutting machine for small pipe.</li> <li>3 spirit levels.</li> <li>2 saws.</li> <li>1 ax.</li> <li>2 hatchets.</li> <li>2 mason's trowels.</li> <li>2 mortar hoes.</li> <li>2 sand sieves.</li> <li>1 pair rubber mittens.</li> <li>1 pipe vise.</li> <li>1 blacksmith vise.</li> <li>13 iron rings for mauls.</li> <li>2 pipe chains, 6 and 9 feet, respectively.</li> <li>4 monkey wrenches.</li> <li>3 files, 14-inch.</li> <li>18 jack screws.</li> <li>1 tapping machine, Smith patent, with 4 eyeballs and extra domes.</li> <li>6½ pairs calking tools.</li> <li>4 calking hammers.</li> <li>13 yarning tools.</li> <li>12 cape chisels.</li> <li>5 cutting chisels.</li> <li>13 cold chisels.</li> <li>14 diamond points.</li> <li>15 pairs cement pipe molds.</li> <li>2 auger bits, with handles.</li> <li>1 brace and bit.</li> </ul> |
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## PIPE-LAYING TOOLS.—Continued.

1 pair rock grabbing hooks.	2 ratchets.
2 steel rock-wedges.	1 pair of calipers.
4 dogs, 1 to 3 feet long.	1 pair of steel compasses.
2 puddling bars, with wrench.	1 steel square.
3 pipe chains for 12 20-inch pipe.	1 Anvil.
2 pipe scrapers.	1 draw knife.
5 6-inch logging caps.	2 branding irons.
3 dirt scrapers.	1 iron bar.
1 drag rake.	4 wooden blocks and falls.
17 dirt rammers.	150 feet 1-inch rope.

## CONNECTION STOCK AND TOOLS.

5258 pounds $\frac{1}{2}$ to $1\frac{1}{2}$ -inch lead pipe, extra strong.	4 $1\frac{1}{4}$ -inch stop and waste valves.
250 feet $1\frac{1}{2}$ -inch galvanized pipe.	154 Bingham & Morgan stop boxes.
714 feet $1\frac{1}{4}$ -inch galvanized pipe.	2 sample stop boxes.
666 feet $\frac{3}{4}$ -inch galvanized pipe.	1 sample wrought iron stop box.
60 feet $\frac{1}{4}$ -inch tin pipe, for thawing out services.	3 wrought iron stop boxes.
26 pounds solder.	1 lot condemned stop boxes.
8 2-inch plugs.	1 Valve rod for turning on and shutting off water.
10 $1\frac{1}{2}$ -inch plugs.	7 folding stop cock rods.
7 $1\frac{1}{4}$ -inch plugs.	6 straight stop cock rods.
12 1-inch plugs.	6 stop cock poles.
36 $\frac{3}{4}$ -inch plugs.	6 stop box covers for asphalt paved streets.
15 $\frac{1}{2}$ -inch plugs.	3 extra special covers for stop boxes.
2 $1\frac{1}{2} \times \frac{1}{2}$ -inch Ts.	2 sand rock connection drills.
6 $1\frac{1}{4} \times \frac{1}{2}$ -inch Ts.	1 sandrock auger.
3 $1 \times \frac{1}{2}$ -inch Ts.	12 drill hole scrapers.
1 2-inch union.	6 scoopers.
3 $1\frac{1}{4}$ -inch unions.	3 dirt augers.
1 $\frac{3}{4}$ -inch union.	4 pairs 2-inch extension pipe tongs.
1 $1\frac{1}{2}$ -inch brass nipple.	2 pairs $1\frac{1}{2}$ -inch extension pipe tongs.
3 1-inch brass nipples.	4 pairs 1-inch extension pipe tongs.
40 1-inch corporation cocks.	1 crow foot for tapping mains.
13 $\frac{3}{4}$ -inch corporation cocks.	1 tap handle.
27 $\frac{5}{8}$ -inch corporation cocks.	2 Mueller tapping machines, complete with taps and drills from $\frac{3}{4}$ to 1 inch.
27 $\frac{1}{2}$ -inch corporation cocks.	2 Plumber's furnaces.
1 2-inch stop and waste cock.	1 kit plumbing tools, complete.
16 1-inch stop and waste cocks.	4 rimmers, 1 to 2 inch.
40 $\frac{3}{4}$ -inch stop and waste cocks.	6 taps and drills, from 13-16 to 2-inch.
42 $\frac{5}{8}$ -inch stop and waste cocks.	
15 2-inch Chapman valves.	
1 2-inch check valve.	
39 2-inch old valves.	
4 $1\frac{1}{4}$ -inch valves.	
8 $1\frac{1}{2}$ -inch stop and waste valves.	

## STABLE AND MISCELLANEOUS ACCOUNT.

4 horses.	5 buckets.
1 large truck for hauling 20 to 36-inch pipe (4-wheeled).	7 wheelbarrows.
1 large truck for hauling 12 to 20-inch pipe (2-wheeled).	3 wheelbarrows, for tunnel use.
1 light truck.	2 2-wheeled pipe trucks.
2 light wagons.	14 brooms.
2 buggies.	2 steel brooms.
2 light bob sleighs.	1 writing desk.
3 cutters.	4 1-gallon cans.
4 sets single harness.	1 5-gallon can.
6 horse blankets.	2 pairs window sash.
22 pairs bedding blankets.	1 beam scale.
4 robes.	2 platform scales.
2 manure forks.	5 kerosene barrels (empty).
Small quantity of feed for horses.	1 spade.
2 farmer's kettles.	1 garden hose.
1 curry comb and brushes.	1 plow.
1 box wood stove.	1 sod cutter.
10 pairs rubber boots.	1 roller toboggan, with 1000 feet $\frac{1}{2}$ -inch rope.
18 lanterns.	1 well measure windlass.
26 lamp globes.	2 tape lines.
2 tents.	1 log hook.
1 grindstone.	2 drag forks.
	3 pairs of grab tongs.

## MIDWAY STATION.

## GATES.

3 gate wrenches.		1 gate box, 6-inch.
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## HYDRANTS.

1 S. Mathew hydrant (for repairs).		Miscellaneous lot of hydrant dupli-
3 hydrant wrenches.		cates.
1 kit of tools for repairing hydrants.		

## PIPE LAYING TOOLS.

1 work bench.		1 striking hammer (5 lbs.)
1 tool box.		3 files, 14 inches long.
2 lead ladles.		1 crowbar.
1 lead pot.		1 pipe vise.
1 lead furnace.		3 pipe chains for 12 to 20-inch.
1 lead pot and furnace on wheels.		13 maul heads.
2 monkey wrenches for gate and hy-		1 buck saw.
drant repairs.		1 hand saw.
2 derricks (1 3-legged and 1 4-leg-		1 spirit level.
ged).		1 set calking tools.
6 shovels (short-handled).		2 blocks and falls, with reserve rope.
3 picks.		30 pounds hemp packing.
2 sledge hammers (16 lbs.)		200 pounds pig lead.

## CONNECTION STOCK AND TOOLS.

12 $\frac{3}{4}$ -inch corporation cocks.		1 valve rod for turning on and shut-
10 1-inch corporation cocks.		ting off water.
1 $1\frac{1}{4}$ -inch stop and waste valve.		1 kit of plumbing tools, complete.
9 $\frac{3}{4}$ -inch stop and waste cocks.		1 Mueller tapping machine.
11 1-inch stop and waste cocks.		1 plumber's furnace.
3 stop boxes.		1 set calking tools.
1 stop cock rod for turning on and		
shutting off water.		

## STABLE AND MISCELLANEOUS ACCOUNT.

1 light truck.		1 grinding stone.
1 garden hose (50 feet long).		4 lanterns.
1 scythe.		1 wheelbarrow.
1 mason's trowel.		1 dirt scraper.
1 tape line (50 feet).		1 fork.
1 pair rubber boots.		

INVENTORY OF TOOLS AND STOCK AT McCARRON LAKE PUMPING  
STATION, JAN. 1, 1897.

1 Vise.		1 24-inch square.
1 set of screw dies and taps from		3 chairs.
$\frac{1}{4}$ inch to 1 inch.		2 ladders.
1 set of pipe dies and taps from $\frac{1}{4}$		2 step ladders.
inch to 2 inches.		1 good cupboard.
2 pipe cutters.		1 oil and waste cupboard.
1 pair 2-inch pipe tongs.		1 work bench.
1 24-inch pipe wrench.		6 cuspidors.
1 12-inch pipe wrench.		1 ratchet.
1 24-inch Coe's wrench.		1 ratchet brace and bit.
1 14-inch Coe's wrench.		4 jack screws.
1 8-inch Coe's wrench.		75 feet $\frac{3}{4}$ -inch rope and block.
1 portable blacksmith forge.		1 draw knife.
1 anvil.		1 planer.
1 sledge hammer.		6 chisels.
2 hand hammers.		1 Edison recording gauge.
1 soft hammer.		1 Thompson's indicator.
6 files.		1 lot of old pipe and fittings.
2 saws.		1 gate wrench.
1 ax.		3 steel brooms.
1 hatchet.		2 brooms.
1 $1\frac{1}{2}$ -ton chain block.		1 pair rubber boots.
1 3-ton chain block.		175 pounds waste.
50 feet $1\frac{1}{4}$ -inch rubber hose.		3 pounds tallow.

## INVENTORY AT McCARRON LAKE.—Continued.

50 feet $\frac{3}{4}$ -inch rubber hose.	25 pounds hemp packing.
3 oil tanks.	5 pounds steam packing.
3 2-quart oil cans.	5 pounds rainbow packing.
2 3-quart oil cans.	2 pounds polishing paste.
4 hand oilers.	40 bars of soap.
1 quart measure.	18 cans of lye.
1 12-inch level.	20 gallons cylinder oil.
1 steel coal wheelbarrow.	2 gallons engine oil.
3 coal scoops.	5 gallons kerosene oil.
2 coal hammers.	125 tons Yough. coal.
1 Fairbank 6-ton.	4 shovels.
1 Fairbank 1000-pound scale.	1 water pail.
1 grindstone.	1 Concord buggy.
3 large lanterns.	1 regrounding valve machine, $\frac{1}{4}$ to 4 inch.
4 small lanterns.	1 old 54-inch boiler front.
1 clock.	1 stove, with pipe at terminal chamber.
1 writing desk.	
12 electric lamps.	

## INVENTORY OF STOCK AND TOOLS AT THE WEST SIDE PUMPING STATION, JAN. 1, 1897.

1 24-inch pipe wrench.	1 set engineer 5-piece brass hand oilers.
1 14-inch Coe's wrench.	2 $\frac{1}{2}$ -gallon measures.
1 hand saw.	2 hand oilers.
1 ax.	1 set of wrenches for pumps.
1 hatchet.	1 set fire tools.
3 oil tanks.	100 feet of $\frac{3}{4}$ -inch garden hose.
1 1000-pound Fairbanks scale	25 feet of 1-inch hose.
1 vise.	25 feet of $\frac{3}{4}$ -inch steam hose.
1 work bench.	14 tons Yough. coal.
2 coal shovels.	$\frac{1}{4}$ cord slabs.
1 wardrobe.	42 gallons engine oil.
1 clock.	25 gallons cylinder oil.
3 large lanterns.	5 pounds waste.
1 writing desk.	5 gallons boiler compound.
2 chairs.	1 lawn mower.
1 gate wrench.	1 hay rake.
1 steel coal wheelbarrow.	1 4-inch flue cleaner.
1 cuspidor.	
1 step ladder.	

## INVENTORY OF STOCK AND TOOLS AT BALDWIN LAKE PUMPING STATION, JAN. 1, 1897.

1 No. 10 centrifugal pump.	2 low pressure pistons.
1 force pump.	1 set wrenches for pumps.
2 pieces 10-inch wrought iron pipe, 6 feet long.	1 34-inch old smoke stack, 45 feet long.
2 pieces 10-inch wrought iron pipe, 5 feet long.	1 3-inch old safety valve.
Some old pipe and fittings.	1 4-inch old gate valve.
2 10-inch Ells.	1 hand push car.
2 steel brooms.	200 lin. feet second-hand light R. R. track.
1 $3\frac{1}{2}$ -inch steam flue cleaner.	2 flat boats.
12 brass springs.	4 cords oak wood.
2 gate wrenches.	

## INVENTORY OF STOCK AND TOOLS AT VADNAIS LAKE PUMPING STATION, JAN. 1, 1897.

## GATE HOUSE.

4 storm windows.	8 steel traps.
4 window screens.	1 gate wrench.
2 brooms.	1 gate lock and key.
1 steel broom.	1 boat chain.
1 shovel.	1 row boat.
1 galvanized pail.	1 pair oars.
1 ice chisel.	1 pair rubber boots.
1 ice saw.	

## DWELLING HOUSE.

15 storm windows.	1 hand pump.
13 window screens.	1 kalsomine brush.
3 screen doors.	2 storm doors.
1 thermometer.	2 ventilators for chimneys.

## PUMPING STATION.

5 monkey wrenches.	1 shovel.
2 S. wrenches.	1 pick.
2 pipe wrenches, Stilson.	1 vise.
2 cold chisels.	1 steel coal wheelbarrow.
4 files.	1 1384 scale.
2 hammers.	1 grindstone.
4 hand lanterns.	1 writing desk.
5 large globe lanterns.	2 chairs.
1 spirit level.	1 cuspidor.
3 paint brushes.	1 8-day clock.
1 hand saw.	1 ax.
1 3-inch steel flue cleaner.	1 grub hoe.
3 50-gallon oil tanks.	1 brush hook.
40 gallons cylinder oil.	1 iron block plane.
50 gallons engine oil.	1 draw knife.
40 gallons kerosene.	1 tray brass oilers.
10 tons coal.	2 steel oilers.
1 coal pick.	1 brace and bit.
2 scoop shovels.	1 belt punch and rivet set.
100 feet 1-inch rubber hose and nozzle.	1 Fairbanks platform scale.
50 feet 1¼-inch rubber hose and nozzle.	

INVENTORY OF STOCK AND TOOLS AT HIGH SERVICE RESERVOIR,  
JAN. 1, 1897.

4 chairs.	10 window screens.
1 rocker.	1 grinding stone.
1 rug, 7x9 feet.	2 gate wrenches.
1 table.	1 air vent rod.
1 screen door.	1 stop wrench for valves.
3 window shades.	2 sets of sprinkling hose.
4 cellar storm windows.	1 spade.
12 storm windows.	2 rakes.
2 storm doors.	1 sickle.
8 shovels.	1 manure fork.
4 picks.	1 coal stove and 6 stove thimbles.
1 plow.	1 paint brush.
1 lawn mower.	60 feet ½-inch rope.
2 scythes.	1 sledge hammer, 16 lbs.
5 scythe stones.	2 mortar hoes.

INVENTORY OF STOCK AND TOOLS AT CENTERVILLE LAKE PUMP-  
ING STATION, JANUARY 1, 1897.

1 vise.	200 pounds 50-p spikes.
1 pair pipe tongs.	6 feet 12-inch earthenware pipes.
1 24-inch pipe wrench.	7 wheelbarrows.
1 12-inch pipe wrench.	1 4-inch centrifugal pump and suction hose.
1 24-inch Coe's wrench.	1 4-inch diaphragm pump and suction hose.
1 14-inch Coe's wrench.	20 feet 4-inch iron pipe for 4-inch centrifugal pump.
1 6-inch Coe's wrench.	1 4-inch ell for 4-inch centrifugal pump.
1 hand hammer.	3 blocks and falls for ¾ and 1-inch rope.
1 coal hammer.	2 blocks and falls on hand driver.
1 saw.	2 blocks and falls on 8-inch pump.
1 hatchet.	1,000 feet ¾-inch rope.
1 ax.	1 rubber diaphragm for Edison pump.
3 oil tanks.	1 rubber roll for laying 36-in. pipe.
2 1-quart cans.	2 sheeting hand drivers.
2 3-quart cans.	2 3-inch lagging caps.
1 steel coal wheelbarrow.	
2 coal scoops.	
1 grindstone.	
6 large lanterns.	
2 hand lanterns.	
2 bracket lamps.	
1 clock.	



## CENTERVILLE LAKE PUMPING STATION—Continued.

1 drawknife.	1 mortar hoe.
1 ratchet, brace and bit.	1 4-legged derrick.
1 chain.	18 shovels.
1 2-ton chain block.	6 picks and handles.
1 4-inch steam flue cleaner.	6 wooden mauls.
1 4-inch steam flue cleaner rod.	3 crow bars.
50 feet 1½-inch rubber hose.	1 lead pot.
1 pair rubber boots.	1 ladle.
1 ¾-inch auger.	1 furnace.
2 crow bars.	2 pike poles.
20 gallons engine oil.	1 ¾-inch ship auger with long handle.
16 gallons cylinder oil.	1 ½-inch ship auger with long handle.
10 gallons kerosene.	1 pair carrying hooks.
5 pounds waste.	2 monkey wrenches.
5 pounds piston packing.	1 gate wrench, 11 feet long.
6 chisels.	1 wood saw.
4 files.	1 cross-cut saw.
2 calking tools.	4 galvanized buckets.
1 steel hand oiler.	2 hand axes.
1 1,000 pounds Fairbank scale.	1 long handled axe.
1 No. 3 Blake boiler feed pump.	1 old drill (no points).
54 tons coal.	1 hot blast blower.
1 cord oak wood.	3 lengths sounding rods.
1 boxstove for wood.	6 pairs rubber boots.
3 lengths of stove pipe.	
100 pounds yarn.	
2,000 pounds pig lead.	

## INVENTORY OF THE METER DEPARTMENT, DECEMBER 31, 1896.

1 kit plumbers' tools.	1 carpenter's hammer.
2 plumbers' furnaces.	4 wood chisels.
2 tinners' solder irons.	1 spirit level.
4 pipe wrenches.	1 fifty-foot tape.
7 S. wrenches.	2 two-foot rules.
1 machinist's hammer.	2 sealing stamps.
1 rivet hammer.	1 Fairbanks 1,200-lb. scale.
10 files.	1 testing tank.
6 screw drivers.	4 sheets of cardboard packing.
2 pairs pliers.	1 lb. sealing wax.
1 small chisel.	A lot of miscellaneous fittings from ¾-inch to 4 inches.
3 large chisels.	4 sets of inside Empire gearing.
2 small punches.	1 dozen of change gear wheels for empire.
2 calipers.	3 sets of Crown's inside gearing.
1 divider.	1½ dozen Crown change gear wheels.
1 breast drill, from 1-16-inch to ½-in.	12 sets of Hersey inside gearing.
1 hack saw.	1 dozen Hersey change gear wheels.
10 hack saw blades.	1 dozen Thomson B. change gear wheels.
4 small steel bars.	1 dozen Thomson B. eccentric gears.
1 compass saw.	1 dozen valves, rings and plunges, Worthington meter.
2 hand saws.	2 pairs rubber boots.
1 two-foot square.	
1 plane.	
1 saw set.	

GEO. DOORLEY,  
Inspector of Meters.

# CITY ENGINEER'S REPORT.

OFFICE OF THE CITY ENGINEER,  
ST. PAUL, MINN, Jan. 1, 1897.

*Board of Water Commissioners,*

GENTLEMEN: I submit herewith my annual report of the work of the Board of Water Commissioners which has been under the charge of the engineering department of the city of St. Paul for the thirteen months ending Dec. 31, 1896, together with such statistics and records of the office as pertain to the water department and seem proper to bring to your attention. The change of the fiscal year from November 30th to December 31st to correspond with the reports of other departments necessitates the covering of thirteen months with this report.

The following are the contracts which have been let by the Board of Water Commissioners during the year 1896, and have been directly under the charge of the engineering department, and for which the necessary surveys, plans specifications and estimates have been made:

Thirty-six inch force main, from McCarron lake pumping station to the reservoir; Fairbanks, Morse & Co., contractors.	
Contract finished this year.....	\$7,265.87
Forty-two inch wooden conduit and weir chamber, from the junction of the Otter lake conduit to the Centerville lake pumping station; Hennessy & Cox, contractors.	
Contract price .....	30,758.30
Estimates allowed .....	29,258.30
Centerville lake pumping station; Hennessy & Cox, contractors.	
Contract price .....	9,486.00
Estimates allowed .....	9,436.00
Fifteen million gallon pumping engine at Centerville lake pumping station; E. P. Allis & Co., contractors.	
Contract price .....	20,700.00
Estimates allowed .....	10,350.00
Artesian wells at Centerville lake; J. F. McCarthy, contractor.	
Contract finished. Total .....	16,639.43
Laying pipe line and connecting up artesian wells at Centerville lake; Nicholas Feyen, contractor.	
Contract finished. Total .....	2,996.76
Two artesian wells at Vadnais lake; S. Swanson, contractor.	
Contract finished. Total .....	1,095.00

New boiler at McCarron lake pumping station; John Kenny, contractor.	
Contract price .....	1,162.50
Estimates allowed .....	986.00
Grading on Centerville conduit line; Nicholas Feyen, contractor.	
Contract price.....	1,145.00
Estimates allowed .....	1,095.00
Transporting boilers to Centerville lake; Nicholas Feyen, contractor.	
Contract finished .....	74.00
Smokestack and flue, Centerville lake pumping station; John Kenny, contractor.	
Contract price .....	270.00
Special castings for Centerville extension; St. Paul Foundry Co.	
Contract finished .....	3,530.46

## CONTRACTS LET IN 1895 AND COMPLETED IN 1896.

Concrete conduit from Otter lake; Ransome Subway Co., contractor.	
Total contract price.....	8,850.79
Estimates allowed in 1896.....	1,960.50
Pump well and connection of artesian wells at Vadnais lake; Charles Stone, contractor.	
Total contract price.....	3,875.00
Estimates allowed in 1896.....	1,580.00
Five million gallon pump at Vadnais lake; E. P. Allis & Co., contractors.	
Total contract price .....	7,500.00
Estimates allowed in 1896.....	3,750.00
Engine building at Vadnais lake; St. Paul Building Co., contractor.	
Contract price and estimates allowed.....	397.00

## VADNAIS LAKE PUMPING PLANT.

The 5,000,000 gallon pumping plant at Vadnais lake was tested Jan. 21, 1896. A copy of the results of said test is herewith submitted in order that the board may have a published record for future reference. A record of the work of the pump during the year is given under the head of "Cost of Pumping."

The comparative cost of pumping of the old and new pumping plant at Vadnais lake is as follows:

1895—Total, 237,043,000 gallons; cost, \$2,044.44; cost per million gallons, \$86.25.

1896—Total, 932,141,850 gallons; cost, \$2,643.00; cost per million gallons, \$28.35.

From the above statement of quantities and expense it will be seen that the cost per million gallons delivered in 1896 with the new pumping plant is only 32.87 per cent of the cost in 1895, or a reduction of expenses of 67.13 per cent, which is very close to the estimate given in my annual report for 1895.

As the Vadnais lake system of artesian wells failed to produce continuously 5,000,000 gallons (the capacity of the pump), two additional wells, eight inches in diameter, have been sunk. The contractors experienced a great deal of difficulty in sinking one of the wells; therefore, on account of the lateness of the season, they have not as yet been connected up with the system. The depth of well No. 7 is 112.84 feet and well No. 8 120 feet. Each well is provided with a Cook strainer, about fifty feet long, the contract price being \$6.25 per lineal foot. The size of the openings is what is known as No. 7. The contract price for the wells was \$1.50 per lineal foot. The cost of cutting pipe and putting on valves was fifty dollars per well. The total cost of the wells complete, including strainers, valves, air chambers, etc., was \$1,095.

#### TEST OF THE FIVE MILLION GALLON PUMPING ENGINE AT VADNAIS LAKE, JAN. 21, 1896.

(Duration of test from 9:04 a. m. to 6:27 p. m.)

Total amount of steam.....	5,437.5 lbs.
Average reading suction gauge.....	8.58 lbs. per sq. in.
Average reading pressure gauge.....	5.41 lbs. per sq. in.
Total number of revolutions.....	23,002
Area of pump plunger.....	339.1168 sq. in.
Length of stroke.....	2.5 feet

Indicator cards taken on the pump end during the test showed that from lack of sufficient supply of water from the wells the pump chamber would only fill in proportion of 92.2 per cent. Making therefore a reduction of 7.8 per cent in the work performed on the pressure side of the pump, the duty developed by the pumping engine will be 97,320,000 foot pounds.

#### FORCE MAIN.

The thirty-six inch force main from the McCarron lake pumping station to the reservoir has been completed with the exception of the connection of the reservoir and the pumping station. The work was delayed so late on account of the failure of delivery of some special castings that it was finally decided not to make the connections until spring. The old twenty-inch force main will give all the necessary service until that time. The total length of pipe laid was 7,344 feet. The pipe and specials were purchased by the city and delivered on the ground. The Board of Water Commissioners also furnished all lead and yarn required for laying the



pipe. The work of laying was let by contract at forty-nine and one-half cents per lineal foot. The pipe line for a length of 1,260 feet was carried across a very bad swamp. Across this swamp the pipe rests on piling. The length of piles driven below cut-off was eighteen to sixty-two feet. The longest of these did not reach a solid bottom. The accompanying profile shows the length of piles as driven; also, the fall of the hammer at last blow in feet and the penetration of piles in inches. The weight of the hammer was 2,500 pounds. Two piles were driven in each bent, and the bents were spaced twelve feet apart. The piles were capped with 6x14-inch timbers, on which were placed two longitudinal timbers, twelve feet long, 12x12 inches and three feet six inches between centers, and the pipe rested on saddles placed on top of the longitudinal timbers. The accompanying plan shows the method of construction. All the timbers are below the water level of the swamp.

#### CENTERVILLE LAKE EXTENSION.

According to my recommendation of last year the Centerville lake extension for the further increase of the water supply has been practically completed. It consists of a 42-inch wooden conduit from the junction chamber on the Otter lake conduit to the pumping station at Centerville lake. It is constructed with 2x6 inch staves of Oregon fir, milled to conform to the exact form of the conduit. The lengths used were from 12 to 22 feet, twenty-five staves completing the circle. They were held together by one-half inch steel bands spaced 18 inches apart where the conduit was not under pressure and from 4 to 12 inches apart where under pressure. The ends of the bands were brought together by a special clip and tightened by a nut. The ends of the staves were united by inserting a piece of steel plate  $\frac{1}{2}$  inch thick,  $1\frac{1}{2}$  inches wide and 6 inches long into a saw-cut at the end of each stave. When the staves were driven up it formed a tight joint. The contract price including excavation was \$1.89 per lineal foot. Some difficulty was experienced with the foundation, as the line crossed several marshes. Several plans were tried but the most successful with the least expense was to drive piles by hand, three piles in each bent, about three feet apart; and to build the conduit inside a form fastened to a three inch plank which formed a cap to the piles. The plan of this construction is herewith shown. The conduit is figured to discharge 15,000,000 gallons of water in 24 hours and has a grade of five feet from the junction chamber to the weir chamber, or one foot in 2,000 feet. The figured velocity is 2.4 feet when running full. There are seven manholes, the construction of which is fully shown on the plan. The weir chamber is a brick building 43x23 feet outside. The water is forced from the pumping station to the weir and then runs by gravity to the Otter lake conduit. From the weir chamber to the pumping station the pipe is under pressure and where it joins to the castiron pipe the pressure is 9.4 pounds per square inch. The total cost of the conduit and weir chamber, including manholes, blow-offs, etc., is shown in the accompanying table.



## PUMPING ENGINE.

The pumping engine, designed to deliver 15,000,000 gallons of water in twenty-four hours, was built by E. P. Allis & Co. The contract price was \$20,700.

The engine is a vertical compound condensing engine, with single acting outside packed plungers. The suction pipe is thirty-six inches in diameter, and the discharge pipe thirty-six inches in diameter for thirty-five feet, where it connects with the forty-two inch conduit, 1,500 feet long, to the weir chamber.

The pump is required to hold a vacuum of twenty-one feet at the basement floor. This will give a total lift on the pump of forty-five feet exclusive of friction in the pump and discharge pipe.

The test of the pump has not yet been made. It is, however, running successfully, and everything will probably be ready in about ten days.

The cost of the engine-house and engine foundations was \$9,486.

## CENTERVILLE LAKE WELLS.

The experimental wells at Centerville lake demonstrated that there were two distinct strata from which flowing wells could be obtained, and that the head of water on each strata was practically the same, rising to about elevation 200, city base.

The first is a water-bearing strata of sand and gravel, which was struck at a depth from the surface of from fifty to seventy-six feet, and was from fifteen to twenty-two feet in depth.

The second water vein is in the sand rock, and was struck at a depth of about 350 feet, the wells varying in depth from 302 to 523 feet.

The accompanying plan shows the various strata through which the wells are driven and the depth and dip of each strata; also, the depth of each well. The shallow wells are designated by numerals, the deep wells by letters.

The location of the wells is along the shore of Centerville lake for a distance of 2,260 feet.

The 36-inch pipe from the pumping station is at about the center of the line, and a 24-inch pipe branches out in each direction to connect up the wells. This pipe is reduced to a 20-inch, 16-inch, 14-inch and 12-inch towards each end. The total length of the different kinds is as follows: Twenty-four inch, 766 feet; 20-inch, 536 feet; 16-inch, 475 feet; 14-inch, 126 feet; 12-inch, 357 feet, or a total of 2,260 feet.

There are in all ten deep wells twelve inches in diameter which extend to the sand rock. Total depth, 3,876.5 feet. Average depth, 387.7 feet. There are also eighteen shallow wells, eight inches in diameter, sunk to the sand and gravel strata. Total depth, 1,124.5 feet. Average depth, 62.5 feet. The shallow wells are all provided with a Cook strainer of an average length of twenty-feet.

Each well has a separate connection with the main pipe, so it is possible to connect up and test any one or any number of wells.

In sinking the deep wells quite a difference was found in the amount of flow. At well I. an excellent flow was struck at a depth of eighty feet, and it did not materially increase although sunk to a depth of 344 feet. In pumping from one well the neighboring wells were affected, although not in a like degree.

We had expected to obtain from these wells from ten to twelve million gallons in twenty-four hours, and the results in starting the pumps show that we shall probably get about 10,000,000. We hope that after pumping for some time the wells will clear up and give a little better flow, as that was our experience at Vadnais lake. It will take some time to make the tests, and find out how much we are getting from the shallow wells and how much from the deep wells, and it may be found advisable to sink some of the shallow wells to a greater depth, but we are sure of a supply greater than the daily consumption, and the character of the water can hardly be surpassed. The cost of the wells is shown in the table and the location and details of construction are shown in the accompanying plans.

#### INTAKE.

To provide for taking water from the lake system the 36-inch suction is extended out into the lake 810 feet beyond the junction with the 24-inch pipe line connecting the artesian wells. At the end of the pipe will be placed a sunken crib, the top of which will be eight feet below high water in Centerville lake, which is established at 190, city base. The depth of the water at the crib is ten feet. There is a 36-inch valve placed just beyond the 24-inch Y, and there are also valves on each of the 24-inch branches, consequently the water can be taken from the wells or the lake, or both, as may seem best.

The pipe is now being laid, and is about two-thirds the distance out to the crib. The trench for the pipe was sheeted, and then excavated and the pipe laid. Considerable trouble has been experienced from the water forcing its way under the sheeting and up in the bottom, the material being quite treacherous. The work is being done by the water board by day's labor under direction of the superintendent, Mr. Starkey. The cost of the intake, including pipe, will be about \$5,500.

This extension will very materially add to the quantity and quality of the St. Paul water supply, and with the exception of improvements in perfecting the storage capacity of the Rice lake system, it will probably be many years before any extensive extensions of the system will be required.

#### BOILER AT McCARRON LAKE PUMPING STATION.

One of the old boilers at the McCarron lake pumping plant having been removed to the Centerville lake plant, a contract was let to John Kenny for a new boiler at the McCarron lake pumping station. The specifications called for a tubular boiler, sixty-six inches in diameter and eighteen feet long, and so constructed as to carry a steam pressure of 125 pounds to the square inch. The contract has been completed, and the boiler is in use. When a new 10,000,000 gallon engine is erected as contemplated, it will be necessary to provide another boiler of equal capacity.

## TEN MILLION GALLON ENGINE.

Specifications have been prepared for a 10,000,000 gallon engine at McCarron lake station to take the place of the 1,500,000 gallon engine sold to the park board. This is rendered necessary by the increase of the water consumption, and I trust that your honorable body will take immediate steps to let a contract for the same, as it will require at least eight months before the engine can be erected.

## SURVEYS.

In addition to the survey work for making the plans and specifications for the various contracts let this year, a survey has also been made of the meadow land that would be affected by a rise of the Rice lakes to elevation 190, which has been done to answer suits which have been brought against the Board of Water Commissioners for the flowage of land; and the results of the survey show that there has been no damage whatever done by any action taken by the Board of Water Commissioners in putting in a flume at Baldwin lake for the measurement of the water.

## WATER CONSUMPTION.

The usual record has been kept of the amount of water used, both on the high and low service and from the various sources of supply, all of which is shown in the accompanying table, which gives, by month, a report of the amount of water consumed and the source of supply from which the water is taken.

## COST OF PUMPING.

A careful tabulation has been made of the cost of pumping at the several stations, which includes salaries, fuel, waste, oil, and repairs, and the following tables are submitted as giving the relative cost of running the different plants.

## PRECIPITATION, ST. PAUL, 1896.

The total precipitation from Jan. 1, 1896, to Jan. 1, 1897, was 34.73 inches, which is about 7.3 inches above the normal. Notwithstanding this large precipitation, on account of the small amount of rainfall for a series of several years, the lakes have not as yet recovered from the effects of the drouth but are in better condition than for several previous years. The precipitation of November of 5.07 inches is the largest of which we have any record, with one exception, which was November, 1857.

I submit herewith a record of the annual precipitation at St. Paul from 1837.

## RECOMMENDATIONS.

I would submit for your consideration the following recommendations of work to be done during the year 1897.

First—That a Venturi meter be put in near the terminal chamber of the conduit, to measure accurately the water furnished on the low service supply. This will give us a better check on the work of the pumps on the high service.

Second—That a weir be put in at the Vadnais lake pumping plant, in order to measure more accurately the work of the pumps, and to prevent the sand pumped from the artesian wells from getting into the conduit.

Third—That a proper connection be made between Centerville lake and Peltier lake, to enable us to utilize to better advantage the water of these two lakes in pumping over from the Rice lake system.

Fourth—That a new outlet be constructed at Pleasant lake, with a weir to measure the water taken from this lake.

Fifth—That steps be taken to purchase a dredge to be used on Centerville lake and Peltier lake, to further improve these lakes as storage reservoirs, and that the necessary land be taken about these two lakes so that the Board of Water Commissioners shall have power to hold the water at elevation 190, city base, and to control the water by a dam at the outlet of Lake Peltier.

Respectfully submitted,

L. W. RUNDLETT,  
City Engineer.



## McCARRON LAKE PUMPING STATION.

It was found that, on account of leakage in the valves of Pump No. 3, the actual amount pumped during December, 1895, and January and February, 1896, was less the quantity given in the table of water consumed by an estimated amount of 60,700,000 gallons for the three months, and this number of gallons has been deducted in the estimate below of the economical performance of the pumping plant.

Capacity of Pump No. 1.....	2,000,000 gallons
Capacity of Pump No. 2.....	3,000,000 gallons
Capacity of Pump No. 3.....	6,000,000 gallons

Total number of gallons pumped.....	1,590,824,200
Total amount of coal consumed.....	2,751,698

	Gallons.	Pounds of Coal.	No. of Gals. Per Pound of Coal.
Pumps Nos. 1 and 2.....	257,045,400	538,215	478
Pump No. 3.....	1,333,778,800	2,213,483	603
Average duty during the year for the whole plant.....			72,092,191
Average duty during the year for Engine No. 3.....			75,140,500
Average duty during the year for Engines Nos. 1 and 2.....			59,555,565

		Cost of Raising 1,000,000 Gallons 1 Foot.
Salaries for 1896.....	\$3,474.00	\$0.014599
Fuel .....	5,797.04	0.024342
Waste, oil and repairs.....	598.14	0.002511
Total .....	\$9,869.18	\$0.041452

## PUMP STATION AT BALDWIN LAKE.

		Cost of Raising 1,000,000 Gallons 1 Foot.
Salaries for 1896.....	\$1,564.70	\$0.034008
Fuel .....	1,897.88	0.041250
Waste, oil and repairs.....	48.21	0.001048
Total .....	\$3,510.79	\$0.076306

Amount of water pumped..... 1,917,058,000 gallons

428.75 cords black oak @ 1,500 pounds coal..... 643,125 coal equivalent

269.25 cords mixed wood @ 1,250 pounds coal.... 336,562 coal equivalent

143.75 cords tamarack @ 1,000 pounds coal..... 143,750 coal equivalent

Duty average for the year..... 34,112,030



## WEST ST. PAUL PUMP STATION.

Amount of water pumped.....(gallons)	13,497,120
Amount of fuel consumed.....(pounds)	212,100
Average rate of pumping.....(in 24 hours)	36,877
Average duty during the year.....	11,078,774

Cost of Raising  
1,000,000 Gallons  
1 Foot.

Salaries for 1896.....	\$1,430.00	\$0.50695
Fuel .....	475.17	0.16844
Waste, oil and repairs.....	49.95	0.01770
<hr/>		<hr/>
Total .....	\$1,955.12	\$0.69309

## VADNAIS PUMP STATION.

Amount of water pumped.....(gallons)	1,989,020,366
Amount of coal consumed.....(pounds)	612,614
Average duty during the year.....	49,040,178

Cost of Raising  
1,000,000 Gallons  
1 Foot.

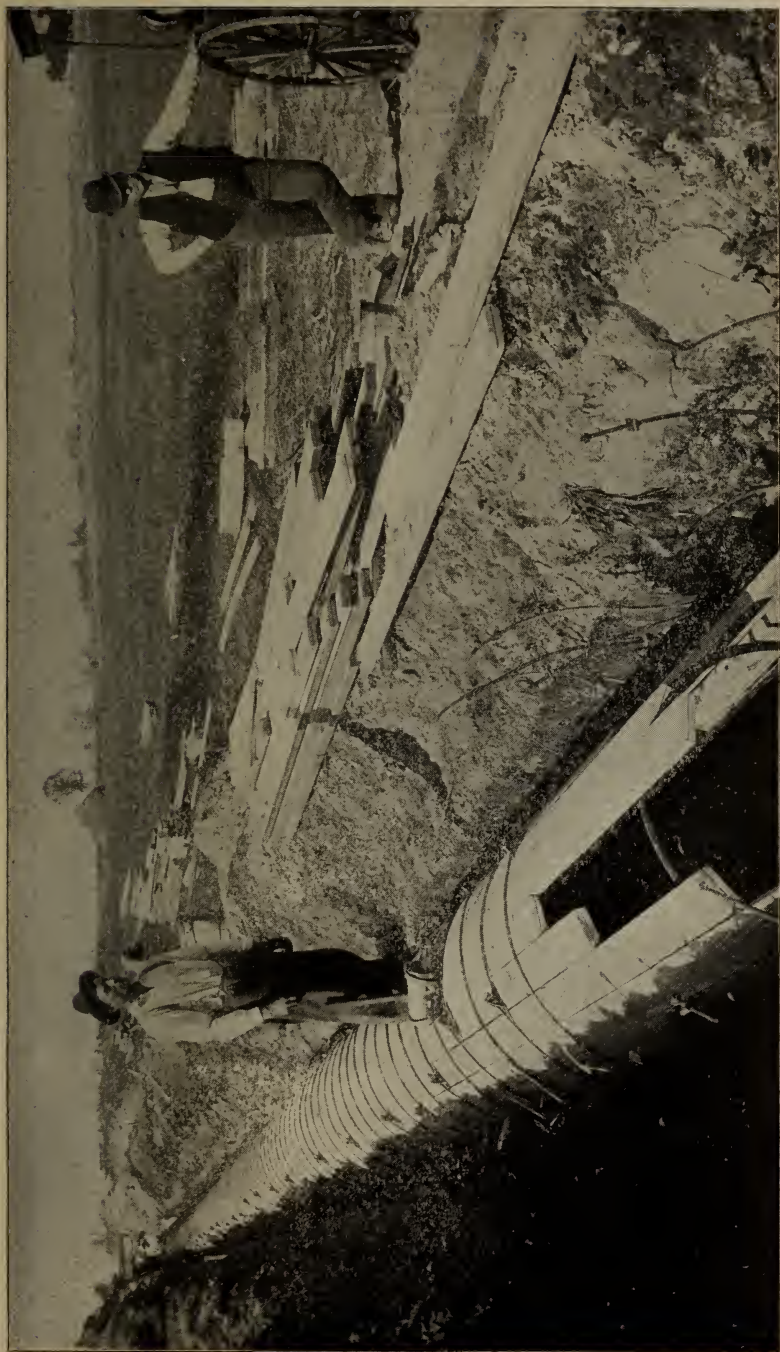
Salaries for 1896.....	\$1,147.48	\$0.03458
Fuel .....	1,380.53	0.04160
Waste, oil and repairs.....	115.50	0.00348
<hr/>		<hr/>
Total .....	\$2,643.51	\$0.07966

About twenty tons of coal have been used for construction and other purposes.

## PRECIPITATION AT ST. PAUL.

FROM DECEMBER 1, 1895, TO JANUARY 1, 1897.

1895.		1896.	
December .....	0.38	June .....	3.30
1896.		July .....	1.12
January .....	0.81	August .....	4.48
February .....	0.17	September .....	2.45
March .....	2.93	October .....	3.39
April .....	5.63	November .....	5.07
May .....	4.67	December .....	0.71



42-INCH WOODEN CONDUIT, CENTERVILLE EXTENSION.



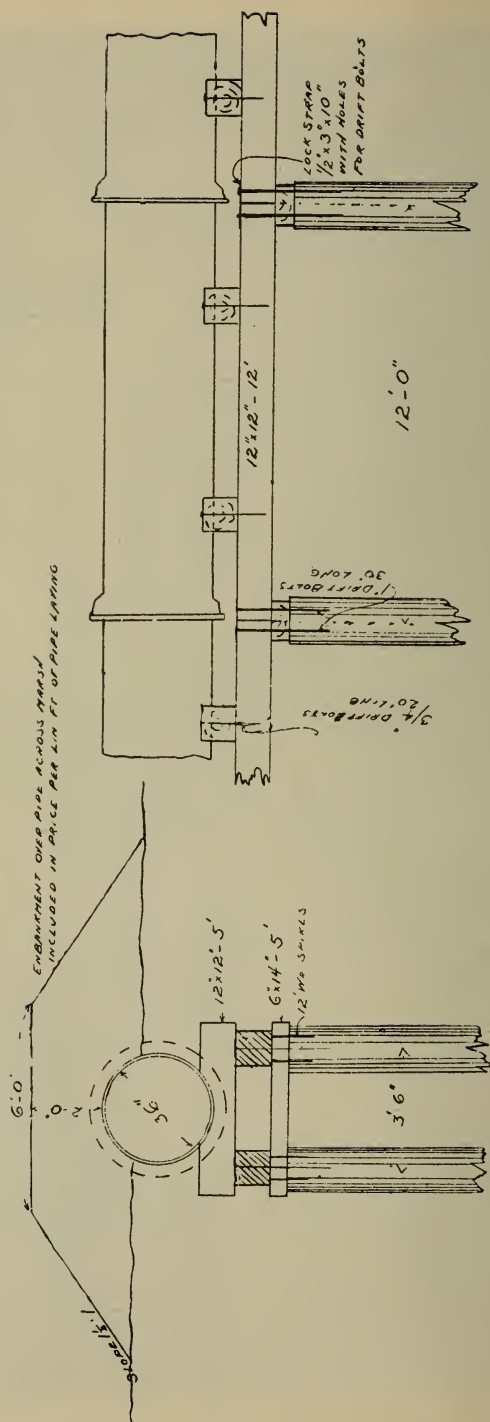
INTAKE PIPE, CENTERVILLE LAKE.





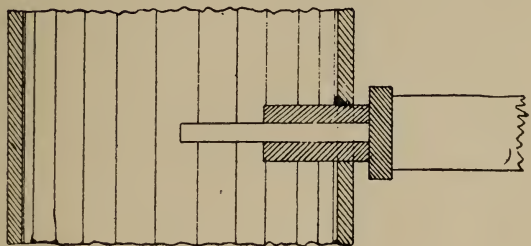
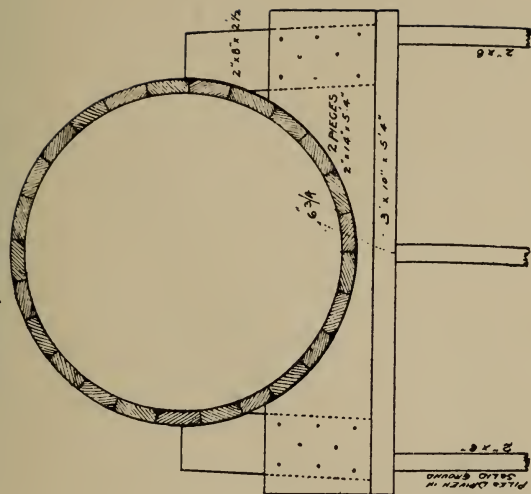
ARTESIAN WELLS, CENTREVILLE LAKE.

PLAN OF PILE FOUNDATION ACROSS MARSH, FROM STA. 5 TO STA 17 ABOUT.





# CRADLE FOR SUPPORT OF WOODEN CONDUIT IN MARSHY GROUND





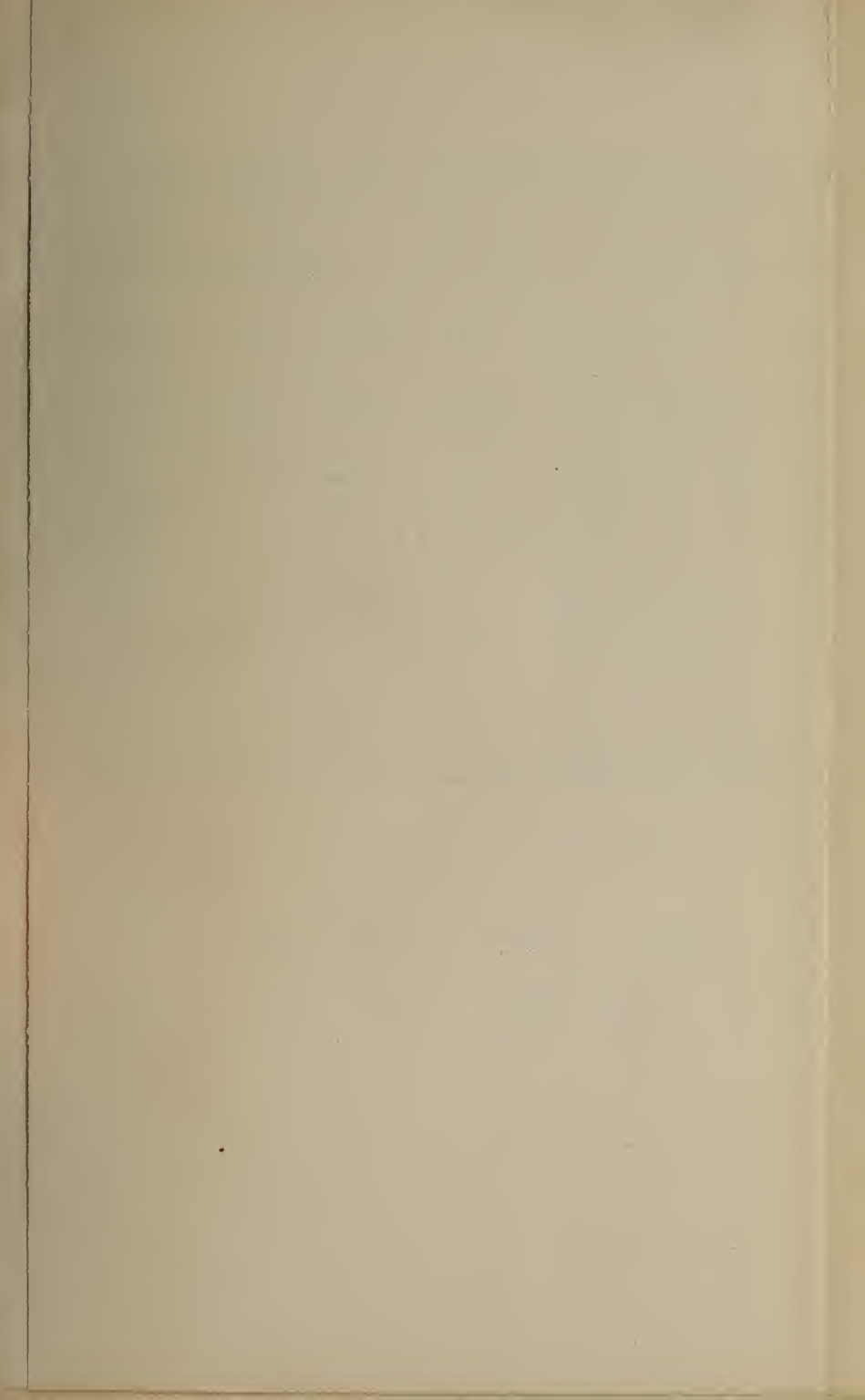


# CENTERVILLE EXTENSION.

## TABLE GIVING TOTAL COST OF THE WORK.

CONTRACTORS.	SUBJECT OF CONTRACT.	Conduit Line.	Pumping Station.	Artesian Wells.	Pipe Line Connecting Artesian Wells.	Intake from Centerville Lake.	Pumping Engine.	Right of Way.	Inspection, Livery, and Other Expenses.	TOTAL.
Henessy & Cox.....	Conduit line.....	\$30,758.30								\$30,758.30
Henessy & Cox.....	Pumping station.....		\$9,486.00							9,486.00
J. F. McCarthy.....	Artesian wells.....			\$16,639.43						16,639.43
J. F. McCarthy.....	Preliminary artesian wells.....			1,961.90						1,961.90
N. Feyen.....	Pipe line con't artesian wells.....				\$2,996.76					2,996.76
N. Feyen.....	Grading of conduit line.....	1,145.00								1,145.00
N. Feyen.....	Drayage of special castings.....	15.84	21.78	70.73	75.92					184.27
N. Feyen.....	Drayage of cast iron pipe.....		127.71		169.13	\$165.71				462.55
N. Feyen.....	Transport of boilers.....		74.00							74.00
St. Paul Foundry Co.....	Special castings.....	417.62	577.40	998.55	1,536.89					3,530.46
John Kenney.....	Smokestack flue.....		270.00							270.00
M. G. Drummond.....	Castiron pipe 8 in. to 20 in.....				1,960.61					1,960.61
Dennis Long & Co.....	Castiron pipe 24 in. to 36 in.....		279.93		1,742.51	3,632.15				5,654.59
South Park Foundry Co.....	Valves.....			671.00	680.00					1,351.00
E. P. Allis Co.....	Pumping engine.....						\$20,700.00			20,700.00
Board of Water Commissioners	Right of way and damages.....							\$5,025.73		5,025.73
Board of Water Commissioners	Material and work.....	158.90	1,226.87	91.56	339.70	*3,434.00			\$1,630.30	6,881.33
		\$32,495.66	\$12,063.69	\$20,433.17	\$9,501.52	\$7,231.86	\$20,700.00	\$5,025.73	\$1,630.30	\$109,081.93

\*Estimated.





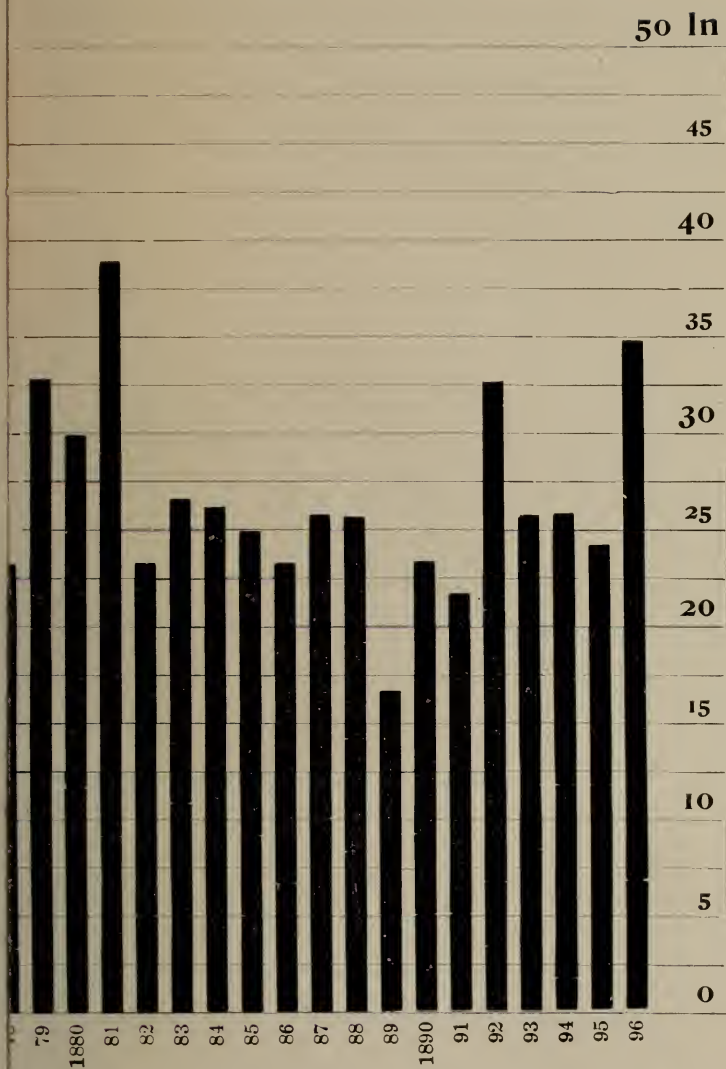
# CONSUMPTION OF WATER, CITY OF ST. PAUL, FROM DECEMBER 1, 1895, TO JANUARY 1, 1897.

MONTH.	FROM LAKE VADNAIS.		FROM ARTESIAN WELLS.		FROM LAKE PHALEN.		TOTAL SUPPLY.		HIGH SERVICE.		LOW SERVICE.		LOW SERVICE.		TOTAL LOW SERVICE.	
	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.
December, 1895.....	211,065,000	6,808,550	6,470,000	208,710	13,149,223	424,169	230,684,223	7,441,429	136,665,100	4,408,551	80,106,620	2,584,085	763,380	24,625	80,870,000	2,608,710
January, 1896.....	129,153,000	4,166,226	117,957,000	3,805,060	14,467,011	467,000	261,577,011	8,438,286	146,260,400	4,718,077	114,350,540	3,688,727	966,060	31,163	115,316,600	3,719,890
February, 1896.....	107,294,000	3,699,793	126,072,825	4,347,339	12,768,466	440,292	246,135,291	8,487,424	136,006,300	4,689,872	109,499,890	3,775,858	647,100	22,313	110,146,990	3,798,171
March, 1896.....	116,934,000	3,772,064	127,065,773	4,098,895	12,075,023	389,517	256,074,796	8,260,476	120,671,000	3,892,613	134,807,040	4,316,354	596,700	19,248	135,403,740	4,335,602
April, 1896.....	118,665,000	3,955,500	108,836,576	3,627,886	9,848,080	328,270	237,349,656	7,911,656	106,252,400	3,541,746	130,336,576	4,344,552	760,680	25,356	131,097,256	4,369,908
May, 1896.....	248,834,000	8,020,452	.....	.....	12,090,000	390,000	260,924,000	8,410,452	140,654,800	4,688,493	133,875,000	4,462,526	1,099,800	35,477	134,705,300	4,345,322
June, 1896.....	262,097,000	8,736,587	.....	.....	14,067,100	468,903	276,164,100	9,205,490	155,713,000	5,023,000	150,196,265	4,845,041	1,948,140	62,843	152,144,405	4,907,884
July, 1896.....	251,920,000	8,126,452	42,802,005	1,380,712	13,135,310	423,720	307,857,405	9,930,884	143,500,500	4,629,048	156,477,355	5,047,650	1,738,440	56,078	158,215,795	5,103,737
August, 1896.....	155,562,000	5,018,130	131,924,100	4,255,620	14,230,155	459,037	301,716,255	9,732,887	122,265,000	4,075,500	144,728,810	4,822,294	1,138,320	37,944	145,867,130	4,860,238
September, 1896.....	131,190,000	4,373,000	124,348,521	4,144,951	12,593,600	419,787	268,132,130	8,937,738	118,289,600	3,815,793	145,629,635	4,697,731	1,198,080	38,647	146,827,715	4,736,378
October, 1896.....	131,969,000	4,257,065	123,144,830	3,972,413	10,003,485	322,693	265,117,315	8,552,171	102,316,500	3,410,550	136,831,958	4,561,165	640,980	21,366	137,472,938	4,582,531
November, 1896.....	200,519,000	6,683,966	29,990,130	999,671	9,280,308	309,344	239,789,438	7,992,981	96,710,900	3,119,061	118,699,032	3,820,001	365,940	11,804	119,064,972	3,840,805
December, 1896.....	203,739,000	6,572,226	.....	.....	12,036,872	388,286	215,775,872	6,960,512	1,651,524,200	4,160,011	1,689,144,221	4,254,771	13,497,120	33,998	1,702,641,341	4,288,769
	2,268,941,000	5,715,217	938,611,850	2,364,262	159,744,042	402,379	3,367,297,492	8,481,858								

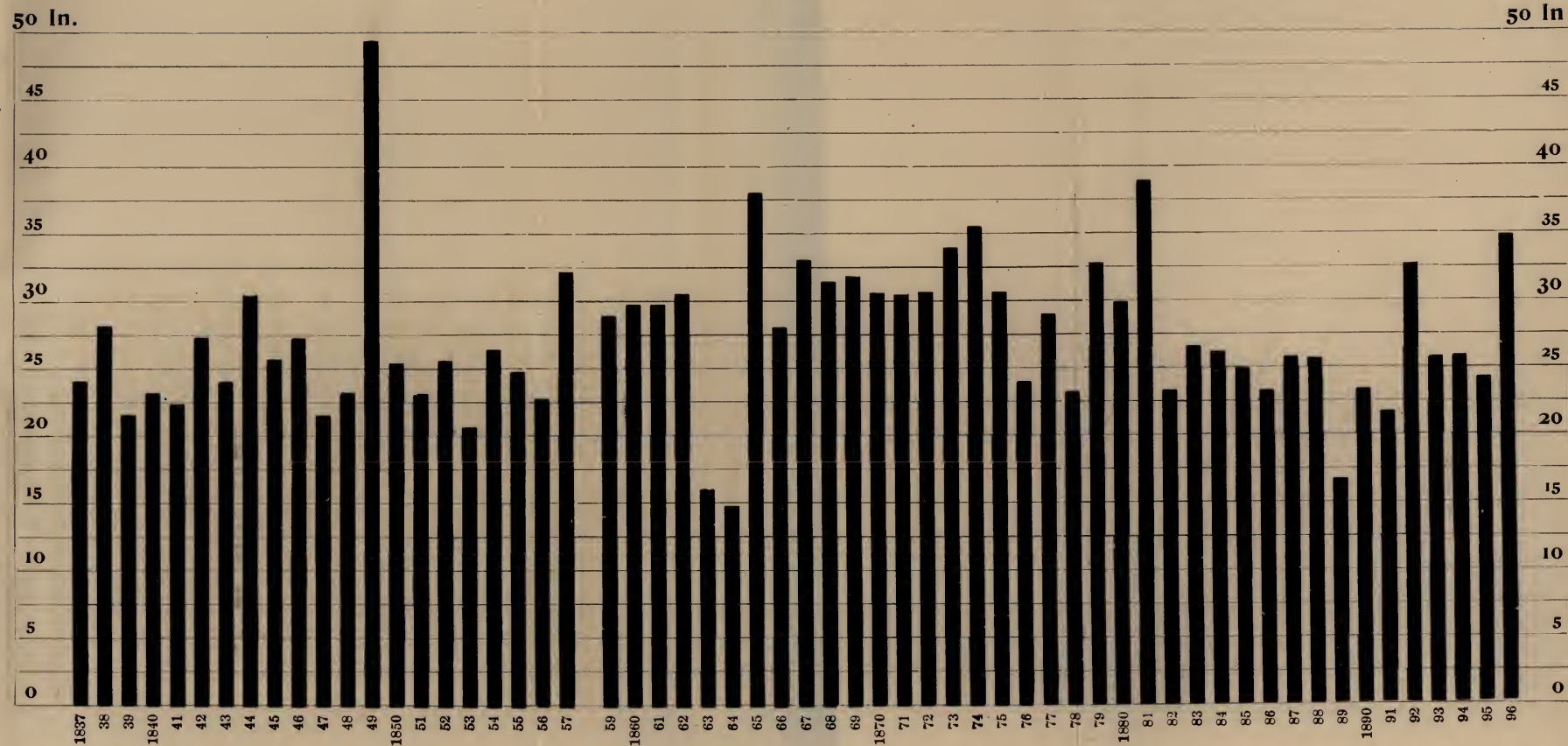
## CONSUMPTION OF WATER PER SERVICE.

	HIGH SERVICE.	LOW SERVICE.				Total High and Low Service.
		West St. Paul High Service.	Low Service From Vadnaia Lake.	Low Service From Phalen Lake.	Total Low Service.	
Number of services.....	8,497	93	5,342	850	6,285	14,782
Daily consumption per service.....	489.6 gals.	365.6 gals.	796.5 gals.	473.4 gals.	682.4 gals.	573.8 gals.

DATE.



ANNUAL PRECIPITATION, ST. PAUL, MINN., FROM 1837 TO DATE.







# RECORD OF MONTHLY AND ANNUAL RAINFALL, ST. PAUL, MINN.

	1837.	1838.	1839.	1840.	1841.	1842.	1843.	1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	Average Rainfall from 1837 to 1897.
January .....	0.27	0.65	1.34	0.49	0.24	0.95	1.15	1.50	0.49	0.52	0.29	0.62	1.00	1.67	0.20	1.09	0.00	0.72	1.67	0.89	3.48	.....	0.50	0.14	0.55	1.35	1.12	0.38	0.65	2.00	0.97	1.71	0.42	1.34	1.61	0.28	1.31	0.49	1.41	0.73	0.55	1.00	0.11	0.81	4.34	0.67	0.64	0.48	0.30	1.76	1.79	0.72	0.55	0.95	1.01	0.20	0.73	1.04	1.05	0.81	0.944
February .....	0.35	0.76	0.30	0.49	0.41	0.72	1.46	0.72	1.40	0.03	0.11	1.13	0.61	0.83	0.13	0.58	0.01	0.03	0.41	0.18	0.94	.....	0.50	1.15	1.94	0.59	0.93	0.00	1.85	0.30	1.12	1.51	2.83	0.60	0.41	0.26	1.54	1.07	1.72	0.66	0.01	0.67	1.12	0.97	2.55	2.35	0.44	1.27	0.20	0.25	0.89	0.64	0.30	0.50	1.18	1.44	1.87	0.10	0.42	0.17	0.810
March .....	0.33	0.15	0.71	0.65	1.43	0.44	0.82	0.97	2.80	1.71	0.44	1.71	4.11	2.23	1.23	1.55	0.02	1.03	1.84	0.22	0.79	.....	3.33	1.04	0.15	0.95	1.97	1.28	2.10	1.32	1.00	1.22	0.96	2.10	2.06	1.64	1.34	2.24	2.19	1.43	1.57	1.24	0.97	2.30	1.06	3.25	0.06	1.34	0.55	1.09	0.33	1.11	0.99	1.11	0.94	0.75	1.96	3.28	0.85	2.93	1.376
April .....	0.95	2.41	2.71	1.55	1.40	2.17	0.75	5.16	3.15	2.90	0.45	0.18	5.62	2.60	2.68	2.16	0.73	2.51	0.28	4.47	4.25	.....	1.70	2.92	2.50	2.67	0.80	0.56	4.29	2.26	2.93	1.31	0.56	1.39	4.25	1.69	2.44	0.95	2.27	2.23	1.92	2.43	0.45	1.58	0.47	1.61	4.92	2.00	3.19	3.67	3.14	5.14	1.14	1.80	1.71	0.97	5.30	4.30	2.09	5.63	2.377
May .....	2.65	3.05	3.28	2.31	1.50	1.68	3.12	4.50	1.51	2.00	4.96	5.28	6.57	0.57	3.96	2.05	4.08	4.30	1.23	1.62	2.05	.....	4.95	6.85	6.36	1.35	2.87	0.47	4.20	0.39	4.45	3.96	2.34	5.24	2.70	5.71	4.63	1.65	3.06	3.15	5.43	2.33	7.18	2.63	4.34	2.44	2.12	2.09	2.12	0.82	1.60	4.75	2.86	3.66	1.33	5.17	2.66	6.63	2.89	4.67	3.293
June .....	3.46	4.76	1.80	3.50	4.24	3.73	5.22	1.64	6.80	3.10	2.66	2.83	3.14	4.62	2.15	5.16	7.59	3.31	2.38	0.76	6.74	.....	5.49	5.00	4.86	2.66	0.02	1.62	6.72	6.00	9.55	2.68	2.22	0.79	6.56	3.81	7.74	11.67	4.33	2.02	7.13	3.58	1.76	5.55	2.87	2.68	7.01	3.57	3.73	3.63	2.89	1.95	1.61	5.29	4.08	7.59	2.00	1.51	4.18	3.30	4.054
July .....	2.73	11.11	3.50	2.89	1.57	1.78	2.09	4.80	2.56	4.95	3.66	4.60	7.59	6.15	2.60	1.57	1.65	3.92	1.32	2.47	0.65	.....	2.95	1.76	2.69	10.15	0.63	4.00	2.55	2.30	2.83	4.05	1.67	3.13	1.48	4.23	3.83	1.94	0.82	2.73	0.52	4.47	9.32	2.75	2.60	2.84	4.33	2.93	5.86	1.44	3.89	5.55	3.08	1.87	2.07	9.04	1.68	0.13	4.12	1.12	3.348
August .....	1.32	3.08	1.04	3.40	1.17	4.81	1.84	4.37	3.28	3.80	2.49	3.19	9.60	2.97	3.29	0.89	2.57	1.75	4.41	1.09	2.03	.....	2.72	0.88	2.97	4.58	3.19	2.00	9.16	4.73	2.32	3.08	7.62	8.56	4.87	3.52	4.61	3.90	8.74	5.28	2.83	1.43	2.78	3.63	4.55	2.45	1.22	2.89	3.69	2.27	3.37	2.23	3.56	2.20	3.42	3.66	2.40	0.36	2.59	4.48	3.409
September .....	5.10	0.71	1.61	2.33	6.10	4.83	5.14	4.26	2.21	2.33	4.00	2.46	2.75	1.82	3.64	2.51	2.14	6.55	6.26	3.24	2.46	.....	3.95	4.72	2.67	2.89	1.23	1.14	1.90	2.26	5.71	2.88	10.61	3.28	2.18	5.62	2.56	5.76	2.16	2.99	2.56	2.13	2.26	1.74	9.95	0.27	2.23	4.48	3.52	3.69	4.35	1.70	0.51	2.73	0.58	1.72	2.70	1.82	4.75	2.45	3.277
October .....	3.15	0.16	2.11	2.21	1.55	*2.11	0.50	0.97	0.66	2.45	0.37	0.68	5.35	0.32	1.18	4.10	0.01	1.23	0.90	3.97	0.00	.....	0.46	4.64	2.80	1.06	1.44	1.60	2.30	2.64	1.01	4.56	0.88	1.95	1.90	0.52	2.57	3.22	1.56	1.27	3.62	1.85	2.56	2.18	4.44	1.99	1.10	2.43	0.93	0.72	1.48	1.10	2.06	2.79	1.57	1.39	1.49	4.49	0.09	3.39	1.865
November .....	1.37	0.43	1.66	3.22	0.81	3.46	1.43	0.77	0.40	2.10	1.71	0.10	1.40	1.68	2.31	1.92	0.56	0.60	2.38	1.70	5.75	.....	2.01	0.52	2.54	0.59	0.29	1.09	0.23	3.19	0.58	3.69	0.75	1.40	1.41	1.91	0.79	1.90	0.84	0.93	1.24	0.61	1.41	2.93	1.36	1.61	1.01	0.65	0.60	2.07	0.65	0.34	0.97	0.38	1.03	0.36	0.81	0.61	0.85	5.07	1.609
December .....	2.34	0.45	1.01	0.13	1.42	0.60	0.27	0.58	0.08	0.21	0.66	0.40	1.95	0.04	0.05	2.27	1.11	0.64	1.67	2.01	2.95	.....	0.75	0.41	0.10	1.37	1.30	0.71	2.19	0.50	0.66	0.58	0.96	0.90	1.20	2.08	0.38	0.72	1.56	0.25	1.42	1.04	2.47	2.69	0.53	0.98	1.59	1.98	0.64	1.48	1.47	0.63	1.32	0.10	2.87	0.53	2.35	1.53	0.38	0.71	1.089
Year .....	24.02	27.72	21.19	23.17	21.67	27.28	23.79	30.24	25.34	26.10	21.80	23.18	49.60	25.50	23.42	25.85	20.47	26.59	24.75	22.62	32.09	.....	29.31	30.03	30.13	30.21	15.79	14.85	38.14	27.89	33.13	31.23	31.82	30.68	30.63	31.27	33.74	35.51	30.66	23.67	28.80	22.78	32.39	29.76	39.06	23.14	26.70	26.11	25.33	22.89	25.85	25.86	16.96	23.38	21.79	32.73	25.95	25.80	24.26	34.73	27.451

\*Rainfall for October, 1842, estimated.

Note.—The records from 1837 to 1854 are from observations taken at Fort Snelling and published by the government in 1855 ("Meteorological Observations by the Medical Corps, U. S. A." Historical Library, St. Paul, Minn.). The records from 1854 to 1857 were obtained from U. S. Engineer's office, St. Paul; from 1859 to 1871 from Rev. A. B. Patterson's meteorological record (Historical Library, St. Paul), and from 1871 to date from the U. S. Signal Service, St. Paul.



# CHIEF ENGINEER'S REPORT.

ST. PAUL, Dec. 31, 1896.

*To the President and Members of the Board of Water Commissioners:*

I respectfully submit to the honorable board my twelfth annual report of the operation of the pumping station for the year ending Dec. 31, 1896.

McCarron lake station engines and boilers have not required much repairing during the year, except the 6,000,000 gallon pump replaced new, soft rubber valve, and taking one 54" x 16' boiler from this station to new Centerville lake station, and replacing one 66" x 18' boiler here.

The West Side station has been in continual operation during the year, and has not required any repairing.

The Vadnais lake new 5,000,000 gallon pump was started up last January, and has been running for the past nine months. It has given good satisfaction.

Baldwin lake station has been running for seven months, and has not required any repairing.

The Centerville lake station new 15,000,000 gallon pump was started up on December 12th.

The following tabulated record shows the operation of the different stations:

## McCarron Lake Station—

Total gallons pumped.....	1,651,524,200
Daily average pumped.....	4,170,515
Total pounds coal used.....	2,751,699
Daily average coal used.....(pounds)	6,915
Daily decrease since 1895.....(gallons)	40,204

## West Side Station—

Total number of gallons pumped.....	13,497,120
Daily average .....	34,083
Total pounds of coal used.....	212,200
Daily average coal used.....	535
Daily increase since 1895.....	5,235

## Vadnais Lake Station—

Total number of gallons pumped.....	1,056,878,516
Daily average gallons pumped.....	4,779,009
Total pounds of coal used.....	612,614
Daily average pounds of coal used.....	2,740

## Baldwin Lake Station—

Total number of gallons pumped.....	1,917,058,000
Daily average .....	9,271,715
Total cords of wood burned.....	841.75
Daily average wood.....	4.30

Respectfully submitted,

MARTIN FEIST,  
Chief Engineer.

## ST. PAUL WATER WORKS' PUMPING STATION, WEST SIDE.

ENGINEER'S REPORT FOR THE YEAR ENDING DECEMBER 31, 1896.

Months.	Number of Hours Pumped.	Total Number of Revo- lutions.	Total Number of Gallons Pumped.	Average Per Day Pumped.	Total lbs. of Coal Used.	Average lbs. Coal Per Day.	Pressure. lbs.
1895. December .....	17.	42,410	763,380	24,625	15,650	505	.....
1896. January .....	21.57	53,670	966,060	31,163	18,050	582	.....
February .....	14.35	33,950	647,100	22,313	15,100	520	.....
March .....	13.20	33,150	596,700	19,248	14,800	477	.....
April .....	16.53	42,230	760,680	25,356	13,200	440	.....
May .....	28.13	61,100	1,099,800	35,477	15,100	487	.....
June .....	36.3	90,750	1,633,500	54,450	17,900	596	.....
July .....	42.52	108,230	1,948,140	62,843	19,700	635	.....
August .....	37.56	96,580	1,738,440	56,078	18,600	600	.....
September .....	24.56	63,240	1,138,320	37,944	15,600	520	.....
October .....	26.10	66,560	1,198,080	38,647	16,050	517	.....
November .....	14.5	35,610	640,980	21,366	15,600	520	.....
December .....	8.11	20,330	365,940	11,804	16,750	540	.....
Total .....	302.2	749,840	13,497,120	33,821	212,100	535	91

Total number of gallons pumped .....13,497,120  
 Daily average..... 33,821  
 Total pounds of coal used..... 212,100  
 Daily average..... 535  
 Daily increase since 1895..... 5,235

## ST. PAUL WATER WORKS' PUMPING STATION, BALDWIN LAKE.

ENGINEER'S REPORT FOR YEAR ENDING DECEMBER 31, 1896.

Months.	No. of Hours Pumped	Total Number of Revolu- tions.	Total Num- ber of Gal- lons Pumped.	Daily Average Gallons Pumped.	Total Cords Wood Used.	Daily Aver- age Cords.	Pres- sure in Feet.
1895.							
December.....	737	521.700	81,385.200	2,625.329	56.50	1.75	26,429
1896.							
January.....							
February.....							
March.....							
April.....							
May.....	499	932.000	212,496,000	10,104.571	89	4.25	
June.....	716½	1,393.500	317,718,000	10,590,600	127	4.25	
July.....	730	1,415.000	323,711,200	10,410,038	136.75	4.38	
August.....	733½	1,415.700	322,779,600	10,412,245	138	4.45	
September.....	711	1,343.790	305,363,600	10,212,120	137	4.33	
October.....	690	1,286.400	293,299,200	9,461,263	132	4.25	
November.....	144	268.900	61,305,200	10,217,533	25.50	4.16	
December.....							
Total .....	4,941	8,576.900	1,917,058.000	9,271,715	841.75	4.30	26,429

Total number of gallons pumped ..... 1,917,058,000

Daily average..... 9,271,715

Total cords wood burned..... 841 75

Daily average cord wood..... 4.30

Average water pressure on discharge and suc-  
tions ..... 26,429 ft.

## ST. PAUL WATER WORKS' PUMPING STATION, VADNAIS LAKE.

ENGINEER'S REPORT FOR THE YEAR ENDING DECEMBER 31, 1896.

MONTHS.	No. of Hours Pumped.	Total Number of Revolu- tions.	Total Number of Gallons Pumped.	Average Per Day Pumped.	Total Lbs. of Coal Used.	Average Coal Used Per Day.	Average Pressure on Suct'n.
1896.							
January.....	634 $\frac{3}{4}$	1,453,841	127,938,064	4,127,034	72,244	2,330	.....
February.....	336 $\frac{1}{4}$	1,552,621	136,630,648	4,711,401	72,960	2,514	.....
March.....	702	1,659,688	146,052,544	4,711,373	81,500	2,629	.....
April.....	599	1,405,431	123,677,928	4,947,117	75,790	3,031	.....
May.....							.....
June.....							.....
July.....	224	528,682	46,524,016	5,145,000	27,200	2,720	.....
August.....	730 $\frac{3}{4}$	1,743,183	153,400,104	4,948,616	89,200	2,878	.....
September.....	694	1,643,083	144,591,304	4,819,710	87,000	2,900	.....
October.....	680	1,627,178	143,191,664	4,619,086	86,700	2,798	.....
November.....	165	396,278	34,872,244	4,981,749	20,080	2,868	.....
December.....							.....
Total .....	4,765	12,009,985	1,056,878,516	4,779,009	612,614	2,740	10 lbs

Total number of gallons pumped ..... 1,056,878,516  
 Daily average gallons pumped ..... 4,779,009  
 Total pounds of coal used ..... 612,614  
 Daily average pounds of coal used ..... 2,740  
 Average pressure on suction..... 10 lbs.

## ST. PAUL WATER WORKS' PUMPING STATION, McCARRON LAKE.

ENGINEER'S REPORT FOR YEAR ENDING DEC. 31, 1896.

MONTHS.	NUMBER OF HOURS PUMPED.			NUMBER OF REVOLUTIONS.			NUMBER OF GALLONS PUMPED.			Total per Month, Engines Nos. 1, 2 and 3.	Average per day Pumped.	Total Pounds of Coal Used per Month.	A. V. lbs. of Coal Used per Day.	Water Pressure In feet.
	Engine No. 1.	Engine No. 2.	Engine No. 3.	Engine No. 1.	Engine No. 2.	Engine No. 3.	Engine No. 1.	Engine No. 2.	Engine No. 3.					
1895.														
December.....			741			955,700				136,665,100	4,408,551	218,669	7,053	157
1896.														
January.....			714			1,022,800				146,260,400	4,718,077	238,010	7,714	160
February.....	7		644			948,900				136,006,300	4,680,872	221,093	7,023	160
March.....	60	613	124			1,368,700				120,671,000	3,892,613	241,313	7,781	157
April.....	89	652				1,456,700				106,252,400	3,541,746	218,807	7,203	150
May.....		298	430			649,700				126,218,700	4,071,571	217,192	7,006	153
June.....			716			983,600				140,654,800	4,688,493	210,309	7,010	157
July.....		53	672			1,028,800				155,713,000	5,023,000	233,056	7,518	165
August.....	9		711			1,003,500				143,500,500	4,629,048	216,093	6,969	156
September.....			720			855,000				122,263,000	4,075,500	190,281	6,342	150
October.....			722			827,200				118,289,600	3,815,793	189,547	6,114	145
November.....			717			715,500				102,316,500	3,410,550	178,691	5,976	144
December.....			676			676,300				96,710,900	3,119,061	178,668	5,763	143
Total.....	165	1,616	7,577	399,700	3,592,000	7,751,600	12,790,400	244,255,000	1,594,478,800	1,651,524,200	4,170,515	2,751,699	6,915	157

Total gallons pumped..... 1,651,524,200  
 Daily average pumped..... 4,170,515  
 Total pounds coal used..... 2,751,699  
 Daily average coal used..... 6,915  
 Daily decrease since 1895—gallons..... 40,204

MARTIN FEIST,

Chief Engineer.



# CITY TREASURER'S REPORT.

OFFICE OF THE CITY TREASURER,

ST. PAUL, MINN., Feb. 26, 1897.

*To the Honorable the President and Members of the Board of Water Commissioners,*

GENTLEMEN: I have the honor to submit to you the following report of the receipts and disbursements of the Water Department Fund and the Water Department Sinking Fund for the fiscal year ending Dec. 31, 1896.

Respectfully,

C. L. HORST,

*City Treasurer.*

Balance on hand Dec. 1, 1895..... \$48,671.22

Cash received from John Caulfield—

Dec. 7, 1895.....	\$1,000.00
Dec. 10, ".....	1,000.00
Dec. 11, ".....	2,000.00
Dec. 14, ".....	1,000.00
Dec. 19, ".....	2,500.00
Dec. 26, ".....	1,000.00
Dec. 27, ".....	1,000.00
Jan. 7, 1896.....	10,000.00
Jan. 10, ".....	5,000.00
Jan. 14, ".....	5,000.00
Jan. 17, ".....	1,000.00
Jan. 18, ".....	1,000.00
Jan. 22, ".....	2,000.00
Jan. 29, ".....	1,000.00
Jan. 31, ".....	1,000.00
Feb. 6, ".....	5,000.00
Feb. 10, ".....	1,000.00
Feb. 13, ".....	2,000.00
Feb. 17, ".....	1,000.00
Feb. 19, ".....	1,000.00
Feb. 21, ".....	1,000.00
Feb. 24, ".....	1,000.00
Feb. 25, ".....	2,000.00
Feb. 28, ".....	2,000.00
Feb. 29, ".....	4,000.00
Mar. 7, ".....	10,000.00
Mar. 10, ".....	10,000.00
Mar. 12, ".....	2,000.00
Mar. 13, ".....	2,000.00
Mar. 17, ".....	2,000.00
Mar. 17, " Frontage tax.....	14,435.28
Mar. 21, ".....	1,000.00

Mar. 23, 1896	2,000.00
Mar. 26, "	1,000.00
Mar. 28, "	1,000.00
Mar. 31, "	1,000.00
April 4, "	2,000.00
April 8, "	1,000.00
April 10, "	1,000.00
April 15, "	1,000.00
April 21, "	1,000.00
April 23, "	1,000.00
April 27, "	1,000.00
May 1, "	2,000.00
May 8, "	1,000.00
May 9, "	1,000.00
May 13, "	1,000.00
May 16, "	1,000.00
May 21, "	1,000.00
May 25, "	1,000.00
June 4, "	1,000.00
June 9, "	1,000.00
June 10, "	1,000.00
June 13, "	1,000.00
June 16, "	1,000.00
June 19, "	1,000.00
June 22, "	1,300.00
June 24, "	500.00
June 26, "	1,000.00
June 29, "	1,000.00
July 1, "	1,500.00
July 8, "	10,000.00
July 11, "	5,300.00
July 14, "	5,000.00
July 16, "	5,000.00
July 18, "	2,000.00
July 21, "	2,000.00
July 22, "	1,000.00
July 24, "	1,000.00
July 29, "	1,000.00
July 29, " Paving Seventh street	25.48
July 31, "	500.00
Aug. 1, " Frontage tax	103,947.13
Aug. 6, "	1,000.00
Aug. 7, "	1,000.00
Aug. 8, "	1,000.00
Aug. 11, "	1,000.00
Aug. 13, "	1,000.00
Aug. 15, "	1,000.00
Aug. 22, "	4,000.00
Aug. 27, "	1,000.00
Aug. 28, "	1,000.00
Aug. 29, "	2,000.00
Aug. 19, "	1,000.00
Sept. 1, "	2,500.00
Sept. 9, "	20,000.00
Sept. 11, "	2,000.00
Sept. 14, "	4,000.00
Sept. 17, "	2,000.00
Sept. 18, "	1,000.00
Sept. 19, "	1,000.00

Sept. 22, 1896.....	1,000.00	
Sept. 25, ".....	1,000.00	
Sept. 26, ".....	2,000.00	
Sept. 30, ".....	1,000.00	
Oct. 1, ".....	500.00	
Oct. 7, ".....	1,000.00	
Oct. 10, ".....	1,000.00	
Oct. 13, ".....	1,000.00	
Oct. 17, ".....	1,000.00	
Oct. 19, ".....	1,000.00	
Oct. 20, ".....	1,000.00	
Oct. 26, ".....	1,000.00	
Oct. 29, ".....	1,000.00	
Oct. 30, ".....	600.00	
Nov. 2, ".....	1,000.00	
Nov. 7, ".....	2,000.00	
Nov. 11, ".....	1,000.00	
Nov. 18, ".....	4,790.07	
Nov. 19, ".....	1,000.00	
Nov. 21, ".....	1,000.00	
Nov. 28, ".....	1,000.00	
Dec. 8, ".....	1,000.00	
Dec. 9, ".....	1,000.00	
Dec. 12, ".....	1,000.00	
Dec. 14, ".....	1,000.00	
Dec. 16, ".....	1,000.00	
Dec. 17, ".....	1,000.00	
Dec. 26, ".....	1,000.00	
Dec. 29, ".....	745.45	
		<hr/>
		\$395,214.63

## DISBURSEMENTS.

December, 1895.....	\$15,356.73	
January, 1896.....	18,611.48	
February, ".....	17,931.81	
March, ".....	31,009.10	
April, ".....	14,121.47	
May, ".....	14,536.51	
June, ".....	14,952.20	
July, ".....	59,593.83	
August, ".....	41,097.89	
September, ".....	48,926.05	
October, ".....	47,440.66	
November, ".....	39,088.85	
December, ".....	20,358.13	
		<hr/>
		\$383,024.71
Balance Jan. 1, 1897.....		12,189.92
		<hr/>
		\$395,214.63

## WATER DEPARTMENT SINKING FUND.

By balance Dec. 1, 1895.....	\$140,910.67
------------------------------	--------------

## RECEIPTS.

Dec. 12, 1895. By certificates of indebtedness department....	\$2,012.50
Jan. 17, 1896. By certificates of indebtedness department....	2,825.00
Mar. 13, 1896. By certificates of indebtedness department....	62.50

May 26, 1896.	By cash.....	88,500.00
May 26, 1896.	By cash.....	2,179.22
July 16, 1896.	By cash.....	110,603.45
July 16, 1896.	By certificates of indebtedness department....	2,910.00
Aug. 15, 1896.	By certificates of indebtedness department....	600.00
Oct. 14, 1896.	By cash.....	15,000.00
Oct. 15, 1896.	By certificates of indebtedness department....	1,180.00
Nov. 13, 1896.	By general fund.....	1,203.08
Dec. 16, 1896.	By certificates of indebtedness department....	290.00

## DISBURSEMENTS.

Jan. 20, 1896.	Sundries .....	\$145,500.00	
Jan. 27, 1896.	Certificates of indebtedness dept..	194.97	
May 26, 1896.	Sundries .....	89,803.33	
July 14, 1896.	Sundries .....	111,500.00	
July 27, 1896.	Sundries .....	3,032.33	
Oct. 13, 1896.	Sundries .....	1,464.97	
Oct. 13, 1896.	Sundries .....	14,690.11	
Balance on hand Jan. 1, 1897.....		2,090.71	
		<hr/>	<hr/>
		\$368,276.42	\$368,276.42









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OF THE

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OF

WATER COMMISSIONERS

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CITY OF ST. PAUL.

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JANUARY 1, 1898.

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ST. PAUL, MINN.:  
THE PIONEER PRESS COMPANY.  
1898.

SIXTEENTH ANNUAL REPORT

OF THE

BOARD

OF

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OF THE

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JANUARY 1, 1898

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COMPLIMENTS OF . . . .

THE BOARD OF

WATER COMMISSIONERS.

JOHN CAULFIELD,

PLEASE EXCHANGE.

SECRETARY.

JANUARY 1, 1898.

ST. PAUL, MINN.:  
THE PIONEER PRESS COMPANY  
1898.



SIXTEENTH ANNUAL REPORT

OF THE

BOARD

OF

THE MINNAPOLIS AND ST. LOUIS RAILROAD COMPANY

ANNUARY 1, 1898

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1898

SIXTEENTH ANNUAL REPORT

OF THE

BOARD

OF

WATER COMMISSIONERS

OF THE

CITY OF ST. PAUL.

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JANUARY 1, 1898.

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ST. PAUL, MINN.:  
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1898.

# OFFICERS

OF THE

## CITY WATER WORKS.

JANUARY 1, 1898.

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### BOARD OF WATER COMMISSIONERS.

R. B. C. BEMENT, President. Term expires Jan. 1, 1901.  
JOHN H. WOLTERSTORFF. Term expires Jan. 1, 1901.  
J. F. HOYT. Term expires Jan. 1, 1900.  
P. W. HUDNER. Term expires Jan. 1, 1902.  
THOS. GRACE. Term expires Jan. 1, 1899.

---

JOHN CAULFIELD, Secretary.

A. R. STARKEY, Superintendent.

L. W. RUNDLETT, City Engineer and Engineer of the Board.

MARTIN FEIST, Chief Engineer and Engineer of McCarron Lake Station.

M. THOMMES, Assistant Engineer of McCarron Lake Station.

H. GEISLER, Gate Keeper and Engineer of Vadnais Lake Station.

A. A. THOMPSON, Assistant Engineer of Vadnais Lake Station.

JACOB ABRESCH, Engineer of Centerville Station.

JOS. DOERR, Engineer of West St. Paul Station.

FRANK GALLOWAY, Assistant Engineer of West St. Paul Station.

GEO. DOORLEY, Meter Inspector.

SIXTEENTH ANNUAL REPORT  
OF THE  
BOARD OF WATER COMMISSIONERS  
OF THE  
CITY OF ST. PAUL, MINN.

---

OFFICE OF THE BOARD OF WATER COMMISSIONERS,  
ST. PAUL, MINN., Jan. 1, 1898.

*To the Honorable Mayor and Common Council of the City of St. Paul:*

GENTLEMEN: The Board of Water Commissioners of the City of St. Paul presents herewith its sixteenth annual report, covering the twelve months ending December 31st, 1897. The previous report of this department covered a period of thirteen months, from December 1st, 1895, to December 31st, 1896, to make the fiscal year of the Board of Water Commissioners conform with that of the other departments of the City, and this must be borne in mind if comparisons of the totals of this year are made with those of last year.

In our report last year your attention was called to the discrepancy between the total cost of the water works as given by the City Comptroller and that which is shown by the figures of actual cost taken from our books. In the Report of the Comptroller of the City of St. Paul, dated December 31st, 1896, the water works are put in at a cost of five million one hundred twenty-nine thousand seven hundred and seventy (\$5,129,770) dollars. In the next annual report, for the year ending December 31st, 1897, in the statement of the assets and liabilities of the city (Exhibit No. 7), the water works are put in at the same figure, viz.: five million, one hundred twenty-nine thousand seven hundred and seventy (\$5,129,770) dollars, when in actual fact, during the year there has been expended fifty-six thousand eight hundred and one dollars and eighty-eight cents (\$56,801.88) for extensions, machinery, distribution mains, meters, etc., less credits for old material sold, and that amount should have been added to the cost of the works given last year. The sinking fund this year has been increased by cash seventy-five thousand dollars (\$75,000), and interest earnings twenty thousand nine hundred and thirty-four dollars and thirty-seven cents (\$20,934.37), making a total of four hundred and sixty-one

thousand five hundred and twenty-five dollars and eight cents (\$461,525.08) in Water Department sinking fund to date; and the total cost of the works to the city, January 1st, 1898, is three million, eight hundred fifteen thousand six hundred and sixty-one dollars and sixteen cents (\$3,815,661.16). This matter is brought up only for the purpose of explaining the discrepancy of one million three hundred fourteen thousand one hundred and eight dollars and eighty-four cents (\$1,314,108.84) between the actual cost of the works to the city and that stated by the City Comptroller, that it may be a matter of record, and accounted for when both reports are printed together in the single volume of the annual reports of the city for the year.

In the report of the City Engineer, herewith appended, you will notice that the average rainfall for the year ending December 31st, 1897, was 30.52 inches, or 3.07 inches greater than the average rainfall up to December 31st, 1896, and 4.21 inches less than the rainfall of the previous year. The rainfall for the year just ended, by months, was generally below the average, but the months of June and July were very large, and greatly in excess of the monthly average, occurring most opportunely, as it filled our lakes nearly to the overflowing point just before the period when our greatest drain upon them began. And for this reason we were not obliged to use our reserve supply, and practically our Centerville and Baldwin Lake plants were not used during the year, except occasionally for testing purposes.

The quality of the water was very satisfactory this year, a fact confirmed by the analyses of the water and the comparatively few complaints from the consumers.

A break occurred in the old force main extending from the McCarron Lake pumping station to the High Service reservoir, on the Rice street embankment, where we had so much trouble last year, but this break was discovered immediately, water was shut off, and very little damage occurred. The necessity for, and the advantage of, having this auxiliary force main to the reservoir was shown. This main was completed early in the Spring and its value was thus demonstrated.

Your attention is called to the increase in the number of water meters in use, fully fifty (50) per cent, and a continuation of the policy of increasing the use of meters is urged. In the Engineer's report this subject has been investigated, and at the end of the present year we hope to have the figures to show more accurately the amount of water required in this locality per capita. From what we have already compiled, it is shown that only about thirty-five (35) gallons are used per capita, as against fifty (50) gallons and upwards, as shown by the unmetered consumers of water.

Since the reduction in the charges for water to both metered and unmetered consumers, seven months only of this year, were affected by the reduction. Six months unmetered consumers, and eight months metered consumers, show a surplus of seven thousand nine hundred and thirty-five dollars and twenty-nine cents (\$7,935.29), over the cost to the depart-



ment to furnish the water, and it is estimated that the full twelve months showing of these reduced rates would make the net expenditures and net receipts about even, leaving nothing for betterments or extensions, and this leaves available only the frontage tax to pay for the extensions, distribution mains, and increase in machinery, which is equitable and as it should be, as the parties who now are getting the benefits of these extensions are the ones who are now paying for them.

Your plant is in excellent condition, in full repair, and when the new ten-million gallon pump is installed at the McCarron Lake station, there will be no need of any increase in machinery for many years to come.

R. B. C. BEMENT,  
THOMAS GRACE,  
P. W. HUDNER,  
JNO. H. WOLTERSTORFF,  
J. F. HOYT.

# SECRETARY'S REPORT.

OFFICE OF THE BOARD OF WATER COMMISSIONERS,  
ST. PAUL, MINN., Jan. 1, 1898.

*To the Board of Water Commissioners,*

GENTLEMEN: I herewith submit my sixteenth annual report, with accompanying statements and tables, showing in detail under appropriate headings the financial operations of the Water Department for the year ending Dec. 31, 1897; also, comparative statements of receipts and disbursements from Aug. 10, 1882 (the time of the purchase of the works by the city), to date.

## REVENUE. (See Table No. 2.)

Balance on hand Jan. 1, 1897.....		\$10,058.17
General water receipts.....	\$170,796.35	
Miscellaneous water receipts.....	14,265.85	
Connections (street services).....	9,174.09	
Extensions .....	1,627.12	
Construction (new supply).....	2,000.00	
Frontage tax .....	106,448.35	
Shutting off and turning on water.....	29.00	
Sinking fund earnings.....	21,759.17	
Sinking fund .....	824.80	
Meter .....	87.01	
	<hr/>	\$327,011.74
Total .....		\$337,069.91

## DISBURSEMENTS. (See Table No. 2.)

General maintenance .....	\$37,105.41	
Connection (street services).....	10,015.19	
Repairs .....	2,408.63	
Meters .....	9,324.50	
Extensions .....	23,305.72	
Construction .....	27,885.79	
Interest .....	114,200.00	
Frontage tax refunded.....	136.27	
Sinking fund .....	96,759.17	
Sinking fund earnings.....	824.80	
	<hr/>	\$321,965.48
Balance .....		\$15,104.43

The general water receipts, including high and low service and meters, for the year were one hundred and seventy thousand seven hundred and ninety-six dollars and thirty-five cents (\$170,796.35). The last report, dated Jan. 1, 1897, was for a period of thirteen months, and it was made to conform with the fiscal year of the other departments of the city, and for the purpose of comparing the receipts of 1896-97 we will deduct the receipts for the month of December, 1896, which amount to five thousand five hundred and fifty-three dollars and sixty-one cents (\$5,553.61). After this deduction the receipts for 1897 as compared with those of 1896 show a decrease of fourteen thousand three hundred and sixty-four dollars and eighty-two cents (\$14,364.82), of which three thousand six hundred and seventy-one dollars and seventeen cents (\$3,671.17) was on low service, six thousand two hundred and eighty-two dollars and twenty-eight cents (\$6,282.28) on high service, and four thousand four hundred and eleven dollars and thirty-seven cents (\$4,411.37) on meter consumers. This decrease was caused by the reduction of water rates, which went into effect with meter consumers on May 1, 1897, low service consumers July 1st, and high service consumers September 1st.

Extension account is credited with one thousand six hundred and twenty-seven dollars and twelve cents (\$1,627.12), derived as follows:

Condemned water pipe.....	\$297.41
Cast iron water pipe.....	269.85
For putting in large services for automatic fire extinguishers...	874.41
For putting in large service connections.....	43.40
For labor furnished contractors in paving streets, etc.....	64.45
Scrap iron, old brass, etc.....	77.60
<hr/>	
Total .....	\$1,627.12

Construction account is credited with two thousand dollars, derived from the sale of the small Allis engine, which was sold to the Board of Park Commissioners.

#### INTEREST ACCOUNT.

One hundred and fourteen thousand two hundred dollars, being interest on the bonded debt, has been paid from the earnings of the works.

#### REPAIR ACCOUNT.

Two thousand four hundred and eight dollars and sixty-three cents (\$2,408.63) was paid on this account, of which one thousand eight hundred and twenty-five dollars and twenty-one cents (\$1,825.21) was on account of fire hydrants, two hundred and one dollars and twenty-six cents (\$201.26) on account of valves, and three hundred and eighty-two dollars and sixteen cents (\$382.16) on account of mains.

## GENERAL MAINTENANCE ACCOUNT.

Thirty-seven thousand one hundred and five dollars and forty-one cents (\$37,105.41) was paid on this account. The expense of maintaining the five pumping stations and Dale street reservoir was thirteen thousand nine hundred and sixty-one dollars and seventy-eight cents (\$13,961.78) (see Table No. 13), of which six thousand nine hundred and fifty-seven dollars and fifty cents (\$6,957.50) was for salaries, six thousand four hundred and ninety-three dollars and ninety-seven cents (\$6,493.97) for fuel, two hundred and eighty-five dollars and thirty-two cents (\$285.32) for waste and machine oils, one hundred and ninety-four dollars and four cents (\$194.04) for supplies and repairs, and thirty-dollars and ninety-five cents (\$30.95) for kerosene oil, leaving a balance of twenty-three thousand one hundred and forty-three dollars and sixty-three cents for salaries and labor of all the officers, employes, office expenses, fuel and all other expenses necessary for maintaining the works. (See Table No. 17 for comparative statements of the expenses of maintaining the pumping stations and reservoirs for the past seven years.)

## EXTENSION ACCOUNT.

Twenty-three thousand three hundred and five dollars and seventy-two cents (\$23,305.72) was paid on account of city extensions, of which eight thousand seventy-seven dollars and eleven cents (\$8,077.11) was for pipe and specials; ten thousand two hundred and eighteen dollars and sixty-nine cents (\$10,218.69) was for labor; and ten hundred seventy-six dollars and fifty cents (\$1,076.50) for fire hydrants; one thousand nine hundred and ninety-one dollars and sixty-nine cents (\$1,991.69) for valves, and one thousand nine hundred and forty-one dollars and seventy-three cents (\$1,941.73) for tools, lead and hemp packing, and lumber and material.

## CONSTRUCTION ACCOUNT.

Twenty-seven thousand eight hundred and eighty-five dollars and seventy-nine cents (\$27,885.79) was paid on this account. This was principally for work done on the Centerville conduit and pumping stations, and the artesian well plant at Vadnais lake station.

## PAY ROLL. (See Table No. 11.)

All of the work in laying water pipes the past season was done under contract. The putting in of service pipes, additional fire hydrants, valves and street sprinkling hydrants was done by day labor; also, considerable work at the various pumping stations, lakes and canals. The pay roll of all officers and employes for the year amounted to forty-five thousand three dollars and thirty-four cents (\$45,003.34), and the monthly average of employes has been ninety-five (95).

## SINKING FUND. (See Table No. 10.)

This fund now amounts to four hundred and sixty-one thousand five hundred and twenty-five dollars and eight cents (\$461,525.08), an increase of ninety-five thousand nine hundred and thirty-four dollars and thirty-seven cents (\$95,934.37) during the year, of which seventy-five thousand dollars was paid from the earnings of the works and twenty thousand nine hundred and thirty-four dollars and thirty-seven cents (\$20,934.37), being the interest earnings on the invested funds. Your attention is respectfully called to Table No. 10, accompanying this report, showing the sinking fund investments, date of investments, date of certificate, when due, etc.

## CONTRACTS. (See Table No. 6.)

Contracts have been let during the year amounting to sixty-one thousand three hundred and eighty-nine dollars and forty-two cents (\$61,389.42), of which twenty-eight thousand nine hundred and forty-nine dollars and thirty-five cents (\$28,949.35) has been paid, leaving a balance of thirty-two thousand four hundred and forty dollars and seven cents (\$32,440.07) to be paid when contracts are completed. On Jan. 1, 1897, date of last report, there was due on contracts not then completed the sum of nineteen thousand four hundred and two dollars and seventy-nine cents (\$19,402.79), on which seventeen thousand five hundred and two dollars and seventy-nine cents (\$17,502.79) has been paid, leaving a balance of nineteen hundred dollars (\$1,900) still due.

## BONDED DEBT. (See Table No. 7.)

No increase has been made in the bonded debt since May 1, 1890. The present bonded debt is two million four hundred and sixty thousand dollars (\$2,460,000), the annual interest of which is one hundred and fourteen thousand two hundred dollars (\$114,200), and is paid from the revenue of the works.

## FRONTAGE TAX. (See Table No. 9.)

There has been collected during the year by the County Treasurer one hundred and six thousand four hundred and forty-eight dollars and thirty-five cents (\$106,448.35) on account of frontage tax. Your attention is called to Table No. 9, accompanying this report, showing in detail the collections, balances, etc., for the various years this assessment has been made.

Your attention is also called to Table No. 19, showing the number of miles of mains laid annually since Aug. 10, 1882 (when the city purchased the works), the cost of same, expenditures for construction outside of city limits, annual maintenance, number of taps, annual receipts from the consumers, and the annual increase from same, frontage tax receipts and assessments, the number of miles of mains that will be dropped annually



from the frontage tax assessments under the law passed by the legislature in 1895 exempting property in front of which water mains are laid from further assessments after having paid ten years. From this table it appears that property in front of eighty-six miles of mains is already exempt and that twenty and one-half miles additional will be exempt upon the payment of the 1897 tax.

#### METERS.

There are now in service 2,300 meters, an increase of 754 during the year, of which the department owns 2,250 and the consumers 50. Eight hundred and fifty-five meters were tested during the year. The board, to encourage the general use of meters, still adheres to the practice of making no charge to the consumer for setting them.

#### SERVICES. (See Table No. 12.)

During the year four hundred and thirty applications have been made for service connections, of which three hundred and thirty-two (332) were on high service and ninety-eight (98) on low service. Total number of applications to date fifteen thousand two hundred and twelve (15,212), of which eight thousand eight hundred and twenty-nine (8,829) are on high service and six thousand three hundred and eighty-three (6,383) on low service. There were but two thousand and twelve (2,012) applications, and all on low service, when the city purchased the works in 1882.

#### PLUMBING AND INSPECTION. (See Table No. 18.)

Forty-seven plumbers were granted licenses during the year, and 1,060 permits were issued to them to do work in connection with the introduction and extension of water services, as against 1,173 in 1896, 1,770 in 1895, 1,065 in 1894, 1,362 in 1893, 1,649 in 1892, 1,991 in 1891, 2,182 in 1890, 2,424 in 1889, 1,707 in 1888, 1,610 in 1887, 1,497 in 1886, 1,454 in 1885, and 718 in 1884. In addition to the inspection and examination of all the work done by licensed plumbers there were 1,080 special inspections, of which 525 were on high service and 555 on low service. All these special inspections were made at the request of consumers, for change of rate.

Table No. 18 shows the character and number of hose violations reported to this department during the past season, and also a comparative statement for the years 1894 to 1897, inclusive.

Respectfully submitted,

JNO. CAULFIELD,  
*Secretary.*

TABLE NO. 1.

## TRIAL BALANCE, DEC. 31, 1897.

Account.	Dr.	Cr.
St. Paul Water Works (original purchase).....	\$510,000.00	
Bond account .....		\$2,460,000.00
General water receipts.....		2,221,488.02
Miscellaneous water receipts.....		267,296.99
Connection (services) .....		5,319.19
Extension .....	1,983,305.39	
General maintenance .....	433,372.31	
Repair .....	56,160.79	
Meter .....	59,202.04	
Construction .....	1,263,153.73	
Interest .....	1,404,742.61	
General water receipts (hydrant account).....		121,663.19
Sinking fund .....	461,525.08	
Sinking fund earnings.....		67,861.89
Shutting off and turning on water.....		2,236.00
Frontage tax .....		1,040,701.10
Bank of Minnesota.....	282.10	
C. L. Horst, city treasurer.....	14,822.33	
	<hr/>	<hr/>
	\$6,186,566.38	\$6,186,566.38

TABLE NO. 2.

## RECEIPTS AND DISBURSEMENTS FROM JAN. 1, 1897, TO DEC. 31, 1897.

Balance Jan. 1, 1897.....		\$10,058.17
General water receipts, high service...	\$65,863.36	
General water receipts, low service...	42,616.68	
General water receipts, meters.....	62,313.31	
	<hr/>	\$170,796.35
Miscellaneous receipts, builders.....	\$448.31	
Miscellaneous receipts, water carts.....	.....	
Miscellaneous receipts, flushing sewers	344.77	
Miscellaneous receipts, filling cisterns.	196.50	
Miscellaneous receipts, sprinkling streets .....	13,276.27	
	<hr/>	\$14,265.85
Connections—(Services) .....	9,174.09	
Extension .....	1,627.12	
Construction (new supply) .....	2,000.00	
Frontage tax .....	106,448.35	
Shutting off and turning on water....	29.00	
Sinking fund earnings.....	21,759.17	
Sinking fund .....	824.80	
Meter .....	87.01	
	<hr/>	\$327,011.74
Total receipts .....		\$337,069.91

## DISBURSEMENTS.

General Maintenance—		
Salaries .....	\$20,571.80	
Stationery and printing.....	1,833.17	
Miscellaneous .....	843.24	
Labor .....	5,397.10	
Material .....	7,701.22	
Stable—feed .....	258.84	
Stable—repairs .....	500.04	
	<hr/>	\$37,105.41
Connections—		
Labor .....	\$6,330.68	
Pipe .....	1,821.51	
Brass goods and stop boxes.....	1,521.85	
Tools and miscellaneous .....	341.15	
	<hr/>	\$10,015.19
Repairs—		
Hydrants—labor .....	\$1,735.98	
Hydrants—material .....	89.23	
Valves—labor .....	201.26	
Valves—material .....	.....	
Mains—labor .....	375.66	
Mains—material .....	6.50	
	<hr/>	\$2,408.63
Meters—		
Labor .....	\$2,661.53	
Freight and meters.....	6,662.97	
	<hr/>	\$9,324.50
Extensions—		
Pipe and special castings.....	\$8,077.11	
Labor and contracts.....	10,218.69	
Tools and repairs of same.....	211.78	
Advertising .....	18.04	
Fire hydrants .....	1,076.50	
Valves .....	1,991.69	
Lead and hemp packing.....	589.44	
Lumber and material.....	764.85	
Miscellaneous .....	357.62	
	<hr/>	\$23,305.72
Construction—New Supply—		
Pipe and special castings.....	\$732.62	
Labor and contracts.....	20,700.77	
Tools and repairs of same.....	2,001.25	
Lumber and material.....	3,231.58	
Freight .....	104.51	
Engineering and right of way.....	929.21	
Miscellaneous and building account..	185.85	
	<hr/>	\$27,885.79
Interest .....	\$114,200.00	
Refunded frontage tax.....	136.27	
Sinking fund .....	96,759.17	
Sinking fund earnings.....	824.80	
Total disbursements .....	<hr/>	\$321,965.48
Balance .....		\$15,104.43

TABLE NO. 3.

RECEIPTS AND DISBURSEMENTS FROM AUG. 10, 1882, TO DEC. 31, 1897.

General water receipts, high service..	\$616,393.59	
General water receipts, low service...	919,352.83	
General water receipts, meters.....	685,741.60	
	<hr/>	\$2,221,488.02
Miscellaneous receipts, builders.....	\$37,916.11	
Miscellaneous receipts, water carts...	3,796.13	
Miscellaneous receipts, flushing sewers	11,916.39	
Miscellaneous receipts, filling cisterns.	20,518.59	
Miscellaneous receipts, sprinkling streets .....	193,149.77	
	<hr/>	\$267,296.99
Connections—(Services) .....	\$301,554.56	
Extension....	32,962.85	
Interest .....	67,964.84	
Meter .....	145.61	
Frontage tax .....	1,043,389.14	
Sinking fund .....	8,775.22	
Shutting off and turning on water...	2,236.00	
Sinking fund earnings.....	73,885.33	
Repairs .....	3,259.15	
General water receipts, hydrant ac- count .....	121,663.19	
Construction .....	5,694.26	
Bills payable .....	653,000.00	
Bonds .....	2,110,000.00	
Total receipts .....	<hr/>	\$6,913,315.16

TABLE NO. III—Continued.

## DISBURSEMENTS.

General Maintenance—		
Salaries .....	\$235,426.87	
Stationery and printing.....	16,457.41	
Miscellaneous .....	9,225.39	
Labor .....	62,081.87	
Material .....	100,587.81	
Stable—feed .....	5,693.23	
Stable—repairs .....	3,899.73	
		\$433,372.31
Connections—		
Labor .....	\$169,258.78	
Pipe .....	77,851.99	
Brass goods and stop boxes.....	40,538.10	
Tools and miscellaneous .....	8,586.50	
		\$296,235.37
Repairs—		
Hydrants—labor .....	\$37,782.05	
Hydrants—material .....	1,818.98	
Valves—labor .....	1,450.65	
Valves—material .....	547.02	
Mains—labor .....	15,565.69	
Mains—material .....	2,255.55	
		\$59,419.94
Meters—		
Labor .....	\$18,965.78	
Freight and meters.....	40,381.87	
		\$59,347.65
Extensions—		
Pipe and special castings.....	\$1,068,786.12	
Labor and contracts .....	632,243.53	
Tools and repairs of same.....	20,058.06	
Advertising .....	352.08	
Fire hydrants .....	98,575.73	
Valves .....	79,721.22	
Lead and hemp packing.....	67,644.23	
Lumber and material .....	23,525.43	
Miscellaneous .....	25,361.84	
		\$2,016,268.24
Construction—New Supply—		
Pipe and special castings.....	\$187,799.33	
Labor and contracts.....	677,007.68	
Tools and repairs of same.....	7,375.99	
Lumber and material.....	93,709.18	
Freight .....	9,583.73	
Engineering and right of way.....	126,740.76	
Miscellaneous and building account..	19,146.55	
Reservoirs .....	147,484.77	
		\$1,268,847.99
Interest .....	\$1,472,707.45	
Refunded frontage tax.....	2,688.04	
Bills payable .....	653,000.00	
Bond .....	160,000.00	
Sinking fund .....	468,924.41	
Sinking fund earnings.....	7,399.33	
		\$6,898,210.73
Total disbursements .....		
Balance .....		\$15,104.43



January, 1897.	
February, 1897	
March, 1897....	
April, 1897.....	
May, 1897.....	
June, 1897.....	
July, 1897.....	
August, 1897...	
September, 189	
October, 1897...	
November, 189	
December, 1897	
Totals.....	

[illegible]

TABLE NO. 20.—ABSTRACTS OF RECEIPTS FOR YEAR ENDING DECEMBER 31, 1897.

MONTH.	GENERAL WATER RECEIPTS.			MISCELLANEOUS WATER RECEIPTS.					Connection (Services).	Shutting off and Turning on Water.	Repairs.	Extensions.	Construction (New Supply).	Bills Payable	Bonds.	Interest.	Frontage Tax.	General Water Receipts, Hydrant Account.	Sinking Fund Earnings.	Sinking Fund.	Meters.	Total Receipts.	
	Semi-annual.		Meters.	Builders.	Water Carts.	Flushing Sewers, Hydrant Streams, Etc.	Filling Cisterna.	Sprinkling Streets.															
	High Service.	Low Service.																					
January, 1897.....	\$113.82	\$20,182.60	\$7,888.52	\$26.46		\$68.14	\$4.50		\$765.72	\$2.00		\$287.00											
February, 1897.....	5,902.59	206.28	5,292.94	6.40		5.50	28.50	\$2,647.18	250.65	1.00		57.98							\$5,832.50				\$38,120.76
March, 1897.....	26,622.69	141.65	5,750.23	9.95		1.00	38.00	2,281.43	185.55	5.00		121.80							540.00		\$5.20		14,944.17
April, 1897.....	687.20	149.22	5,525.42	26.31		4.00	30.00	174.47	1,050.03								\$11,441.24				24.40	46,622.94	
May, 1897.....	758.43	188.48	4,477.79	89.78		3.00	11.50		1,367.28										1,217.11		6.43		8,870.19
June, 1897.....	871.80	2,836.85	4,622.13	14.65		5.00	29.50	2,626.77	723.63								15,000.00				6.00	22,031.51	
July, 1897.....	92.17	16,489.96	4,518.83	32.22		9.00	2.00	412.84	782.65	7.00		47.25					50,000.00		5,902.53	\$824.80	8.55	68,165.91	
August, 1897.....	5,719.86	441.78	4,615.93	36.26		99.83	1.00		664.45	2.00		47.64					23,461.12					45,855.04	
September, 1897.....	24,770.28	122.70	4,961.97	26.56			.50	3,233.14	1,239.67	10.00		512.91	\$2,000.00								21.05	11,649.80	
October, 1897.....	553.02	61.65	5,388.88	82.86		4.00	5.50	1,900.44	816.40	1.00		75.41							2,187.03			89,114.76	
November, 1897.....	240.35	40.54	5,984.75	52.37		59.78	7.00		953.97	1.00		49.00										8,889.16	
December, 1897.....	34.65	1,754.97	3,285.92	41.54		85.52	38.50		324.09			144.18					6,545.99				18.33	13,953.08	
Totals.....	\$65,866.36	\$42,616.68	\$62,313.81	\$448.31		\$344.77	\$196.50	\$13,276.27	\$9,174.09	\$29.00		\$1,627.12	\$2,000.00				\$106,448.85		\$21,759.17	\$824.80	\$87.01	\$327,011.74	

ABSTRACT OF RECEIPTS FROM AUGUST 10, 1882, TO DECEMBER 31, 1897.

From Aug. 10, 1882, to Dec. 1, 1882.....		\$669.80	\$4,299.08	\$670.65	\$208.96	\$25.00	\$342.01	\$1,827.00	\$2,811.27	\$4.00	\$123.39	\$65.59		\$17,000.00								\$27,541.73
For year ending Dec. 1, 1883.....		43,544.40	22,854.92	1,486.00	625.72	247.10	2,518.01	5,646.15	7,876.81	30.00	833.73	5,886.71	\$403.15	111,000.00	\$150,000.00							352,902.20
For year ending Dec. 1, 1884.....		55,539.12	26,720.51	2,479.33	717.85	255.05	3,032.98	6,496.76	12,827.62	127.00	46.06	1,236.47	218.18	165,000.00	600,000.00	\$10,244.39						898,985.32
For year ending Dec. 1, 1885.....	\$7,199.82	66,282.94	29,482.99	2,716.67	559.55	575.50	2,305.99	7,071.95	21,909.84	46.00	1,638.83	896.71	30.90	50,000.00	400,000.00	1,666.67	\$12,269.90					604,654.26
For year ending Dec. 1, 1886.....	16,006.32	68,251.79	30,608.10	2,706.38	484.35	261.83	1,459.58	10,250.58	24,046.61	93.00	46.20	1,174.16	69.90	55,000.00			19,538.26					229,992.06
For year ending Dec. 1, 1887.....	22,246.71	76,778.38	36,866.50	3,688.81	405.55	1,054.80	1,543.84	24,316.50	27,880.91	257.00	62.58	2,782.43	122.50	95,000.00	200,000.00	2,455.00	32,495.91					527,452.42
For year ending Dec. 1, 1888.....	27,566.65	66,066.48	36,406.27	4,146.64	250.95	861.78	1,527.28	19,886.88	27,968.08	94.00	246.05	5,025.08	159.29	300,000.00	300,000.00	24,815.22	43,062.60					558,083.20
For year ending Dec. 1, 1889.....	36,968.72	114,864.87	36,540.55	5,753.11	219.45	591.80	2,186.81	14,517.15	40,418.34	170.00	61.15	8,929.72	502.91	360,000.00		18,201.10	55,066.01					685,021.19
For year ending Dec. 1, 1890.....	45,797.74	79,363.44	43,026.26	8,570.82	176.25	771.92	1,471.52	12,923.26	30,762.18	175.00	74.11	2,315.23		105,000.00	100,000.00	555.55	78,079.70					499,062.98
For year ending Dec. 1, 1891.....	55,662.84	51,788.39	52,110.06	3,620.31	153.00	3,276.34	1,188.14	13,668.03	24,260.02	216.00	42.83	3,016.68	6.50	20,000.00		899.72	88,987.80					318,296.16
For year ending Dec. 1, 1892.....	62,661.97	51,807.44	56,695.28	1,879.42		191.81	442.30	841.56	19,707.70	103.00	56.10	617.38	1,500.00	35,000.00		5,627.19	112,082.57					349,640.82
For year ending Dec. 1, 1893.....	66,859.64	51,601.66	59,138.91	1,701.63		764.32	948.16	16,169.84	14,770.65	644.00	28.62	646.19										453,215.55
For year ending Dec. 1, 1894.....	69,192.88	50,598.02	59,176.42	874.88		811.58	565.19	16,032.83	10,916.35	139.00		544.27	465.73				122,115.05					348,036.24
For year ending Dec. 1, 1895.....	70,704.14	48,788.22	59,754.16	1,521.03		403.43	317.01	13,476.50	14,349.87	78.00		1,915.60	44.70				147,171.40					872,560.46
For year ending Dec. 31, 1896.....	69,659.80	50,796.70	70,268.28	1,021.12		752.31	473.32	17,218.51	11,874.72	31.00		1,283.51	175.50				123,172.48					365,908.31
For year ending Dec. 31, 1897.....	65,866.36	42,616.68	62,313.81	448.81		844.77	196.50	13,276.27	9,174.09	29.00		1,627.12	2,000.00				106,448.85		21,759.17	824.80	87.01	827,011.74
Totals.....	\$616,898.59	\$919,352.83	\$683,741.60	\$37,916.11	\$3,796.18	\$11,916.89	\$20,518.59	\$193,149.77	\$301,554.56	\$2,236.00	\$3,269.15	\$32,962.85	\$5,694.26	\$633,000.00	\$2,110,000.00	\$67,964.84	\$1,043,889.14	\$121,663.19	\$73,885.88	\$3,775.22	\$145.61	\$6,918,815.16

General Ledger					
1900					
Month	Day	Particulars	Debit	Credit	Balance
Jan	1	Balance			100.00
Jan	2	By Cash		50.00	150.00
Jan	3	To Cash	50.00		100.00
Jan	4	By Cash		25.00	125.00
Jan	5	To Cash	25.00		100.00
Jan	6	By Cash		75.00	175.00
Jan	7	To Cash	75.00		100.00
Jan	8	By Cash		100.00	200.00
Jan	9	To Cash	100.00		100.00
Jan	10	By Cash		50.00	150.00
Jan	11	To Cash	50.00		100.00
Jan	12	By Cash		25.00	125.00
Jan	13	To Cash	25.00		100.00
Jan	14	By Cash		75.00	175.00
Jan	15	To Cash	75.00		100.00
Jan	16	By Cash		100.00	200.00
Jan	17	To Cash	100.00		100.00
Jan	18	By Cash		50.00	150.00
Jan	19	To Cash	50.00		100.00
Jan	20	By Cash		25.00	125.00
Jan	21	To Cash	25.00		100.00
Jan	22	By Cash		75.00	175.00
Jan	23	To Cash	75.00		100.00
Jan	24	By Cash		100.00	200.00
Jan	25	To Cash	100.00		100.00
Jan	26	By Cash		50.00	150.00
Jan	27	To Cash	50.00		100.00
Jan	28	By Cash		25.00	125.00
Jan	29	To Cash	25.00		100.00
Jan	30	By Cash		75.00	175.00
Jan	31	To Cash	75.00		100.00
Feb	1	By Cash		100.00	200.00
Feb	2	To Cash	100.00		100.00
Feb	3	By Cash		50.00	150.00
Feb	4	To Cash	50.00		100.00
Feb	5	By Cash		25.00	125.00
Feb	6	To Cash	25.00		100.00
Feb	7	By Cash		75.00	175.00
Feb	8	To Cash	75.00		100.00
Feb	9	By Cash		100.00	200.00
Feb	10	To Cash	100.00		100.00
Feb	11	By Cash		50.00	150.00
Feb	12	To Cash	50.00		100.00
Feb	13	By Cash		25.00	125.00
Feb	14	To Cash	25.00		100.00
Feb	15	By Cash		75.00	175.00
Feb	16	To Cash	75.00		100.00
Feb	17	By Cash		100.00	200.00
Feb	18	To Cash	100.00		100.00
Feb	19	By Cash		50.00	150.00
Feb	20	To Cash	50.00		100.00
Feb	21	By Cash		25.00	125.00
Feb	22	To Cash	25.00		100.00
Feb	23	By Cash		75.00	175.00
Feb	24	To Cash	75.00		100.00
Feb	25	By Cash		100.00	200.00
Feb	26	To Cash	100.00		100.00
Feb	27	By Cash		50.00	150.00
Feb	28	To Cash	50.00		100.00
Feb	29	By Cash		25.00	125.00
Feb	30	To Cash	25.00		100.00
Feb	31	By Cash		75.00	175.00
Mar	1	To Cash	75.00		100.00

General Ledger					
1900					
Month	Day	Particulars	Debit	Credit	Balance
Mar	1	By Cash		100.00	200.00
Mar	2	To Cash	100.00		100.00
Mar	3	By Cash		50.00	150.00
Mar	4	To Cash	50.00		100.00
Mar	5	By Cash		25.00	125.00
Mar	6	To Cash	25.00		100.00
Mar	7	By Cash		75.00	175.00
Mar	8	To Cash	75.00		100.00
Mar	9	By Cash		100.00	200.00
Mar	10	To Cash	100.00		100.00
Mar	11	By Cash		50.00	150.00
Mar	12	To Cash	50.00		100.00
Mar	13	By Cash		25.00	125.00
Mar	14	To Cash	25.00		100.00
Mar	15	By Cash		75.00	175.00
Mar	16	To Cash	75.00		100.00
Mar	17	By Cash		100.00	200.00
Mar	18	To Cash	100.00		100.00
Mar	19	By Cash		50.00	150.00
Mar	20	To Cash	50.00		100.00
Mar	21	By Cash		25.00	125.00
Mar	22	To Cash	25.00		100.00
Mar	23	By Cash		75.00	175.00
Mar	24	To Cash	75.00		100.00
Mar	25	By Cash		100.00	200.00
Mar	26	To Cash	100.00		100.00
Mar	27	By Cash		50.00	150.00
Mar	28	To Cash	50.00		100.00
Mar	29	By Cash		25.00	125.00
Mar	30	To Cash	25.00		100.00
Mar	31	By Cash		75.00	175.00
Apr	1	To Cash	75.00		100.00



TABLE NO. 21.

## MONTHLY ABSTRACT OF DISBURSEMENTS FOR YEAR 1897.

NUMBER OF VOUCHER.	Month	Total Amount.	GENERAL MAINTENANCE.							CONNECTIONS.				REPAIRS.				METERS.		EXTENSIONS.										CONSTRUCTION—NEW SUPPLY.										Interest.	Refunded Frontage Tax.	Bills Payable.	Bond.	Sinking Fund.	Sinking Fund Earnings.
			Salaries.	Stationery and Printing.	Miscella- neous.	Labor.	Material and Fuel.	STABLE.		Labor.	Pipe.	Brass Goods and Stop Boxes.	Tools and Miscella- neous.	HYDRANTS.		VALVES.		MAINS.		Labor.	Freight and Meters.	Pipe and Special Castings.	Labor.	Tools and Repairs of Same.	Advertising.	Fire Hydrants.	Valves and Valve Boxes.	Lead and Hemp Packing.	Lumber and Material.	Miscella- neous and Building Account.	Pipe and Special Castings.	Labor and Contracts.	Tools and Repairs of Same.	Lumber and Material.	Freight.	Engineering and Right of Way.	Miscella- neous and Building Account.	High Service Reservoir.							
								Feed.	Repairs.					Labor.	Material.	Labor.	Material.	Labor.	Material.																										
8480 to 8527 inclusive.....	January, 1897.....	\$20,323.12	\$1,386.66	\$115.67	\$80.75	\$444.84	\$403.40	\$24.84	\$11.33	\$430.25			\$8.28	\$241.50				\$7.50		\$196.21		\$6.05	\$145.25	\$8.10			\$17.50	\$7.89	\$0.22		\$304.63	\$860.17	\$157.08		\$19.25	\$8.85	\$9,690.00	\$9.40			\$5,832.50				
8528 to 8572 inclusive.....	February, 1897.....	24,538.18	1,746.66	112.15	80.19	146.25	1,039.70	1.68	7.35	329.50			5.45	223.62						197.44	\$855.42		571.22	17.80							1,824.10	9.65	95.31		80.29		6,750.00				10,540.00				
8573 to 8652 inclusive.....	March, 1897.....	46,419.73	1,716.32	421.78	68.10	125.75	996.51	19.56	69.75	860.15			12.45	216.50	\$23.00					206.25	713.95	8.20									1,084.71	6.80	238.00		129.00	3.95	25,000.00				15,000.00				
8653 to 8701 inclusive.....	April, 1897.....	20,723.01	1,824.16	108.12	25.00	164.24	728.89		39.55	366.79	\$1,596.05		29.97	203.75	5.50			\$3.00	215.13	21.56		49.34	2.00								5,253.91	2.75	59.04			8.75	8,750.00	31.40			1,217.11				
8702 to 8777 inclusive.....	May, 1897.....	13,874.71	1,546.36	153.35	44.67	313.65	204.19	85.03	70.75	573.42	.85	\$925.00	84.70	173.50					201.19	60.15	123.43	1,072.74	89.73			848.35		49.05		530.42	6.00	185.10		35.51	24.00	7,000.00	24.17			55,902.53	\$824.83				
8778 to 8846 inclusive.....	June, 1897.....	70,284.28	1,501.66	123.21	141.19	686.86	1,039.27		11.50	800.80		504.87	22.43	141.22		\$28.43		32.52		206.77	33.12	13.83	531.05	16.70	\$11.56		25.78	518.98	216.97	\$1.72	715.61	22.05	270.45		76.70	8.14	5,850.00	34.00							
8847 to 8894 inclusive.....	July, 1897.....	12,826.26	1,601.66	18.88	32.25	949.42	210.60	27.15	16.95	605.38		24.73	92.42	88.26		26.75		47.66		210.19		2,892.47	791.52	4.50						173.12		1,029.61	20.25	165.98		46.51		3,750.00							
8895 to 8968 inclusive.....	August, 1897.....	18,080.88	1,501.66	170.79	225.85	759.83	1,053.83	48.02	120.82	503.13	1.08	8.85	28.02	28.04		21.84		18.31		242.94	2,743.67	336.72	1,338.26	24.07			320.00	28.35	45.75	3.58	\$650.32	6.30	1,016.62		46.23		6,750.00	18.00							
8969 to 9039 inclusive.....	September, 1897.....	45,554.81	1,537.66	140.16	58.50	769.13	152.54	.98	90.99	534.13	19.35	1.85	17.65	42.55	4.15	31.39		33.33		260.74	975.10	4,552.80	1,750.04	10.45		\$890.50	222.25	22.96	44.31	30.51	5,789.81	1.00	240.96		72.99	61.60	25,000.00	8.00			2,187.03				
9040 to 9116 inclusive.....	October, 1897.....	20,037.69	1,732.06	181.65	31.00	476.40	472.26	21.26	17.90	618.92	36.15	18.50	30.81	194.01	49.93	13.75		6.34	4.50	290.76	800.00	27.83	2,796.78	27.10			186.00	884.49	.87	12.69	1,743.13	7.50	555.58	\$51.50	48.72			8,750.00							
9117 to 9185 inclusive.....	November, 1897.....	14,362.31	1,710.61	76.65	36.25	332.47	410.24		9.16	618.85	23.95		21.90	123.33		60.54		60.14		226.62		115.78	469.07	12.83			173.32	11.26	4.40	86.82	82.30	1,562.95	40.56	676.18	53.01	306.51	26.72	7,000.00							
9187 to 9268 inclusive.....	December, 1897.....	14,845.50	2,766.33	210.96	74.59	278.76	969.79	30.42	34.00	559.36	144.58	38.55	37.07	59.70	6.65	18.51		169.86		207.29	460.00		683.42		6.48					222.90	855.59	7.90	587.89				11.80				6,050.00				
Totals.....		\$321,965.48	\$20,571.80	\$1,833.17	\$843.24	\$5,397.10	\$7,701.22	\$258.84	\$500.04	\$6,330.68	\$1,821.51	\$1,521.85	\$341.15	\$1,735.98	\$89.23	\$201.26		\$875.66	\$6.50	\$2,661.53	\$6,662.97	\$3,077.11	\$10,218.69	\$211.78		\$1,076.50	\$1,991.69	\$589.44	\$764.85	\$357.62	\$732.62	\$20,700.77	\$2,001.25	\$3,231.58	\$104.51	\$929.21	\$185.85	\$114,200.60	\$139.27			\$6,769.17	\$824.80		

## ABSTRACT OF DISBURSEMENTS FROM AUGUST 10, 1882, TO DECEMBER 31, 1897.

From Aug. 10, 1882, to Dec. 1, 1882.....	\$25,937.61	\$786.10	\$289.13	\$187.69	\$419.62	\$7.83	\$31.06	\$3.75	\$1,285.69	\$963.08	\$454.22	\$249.77	\$61.38	\$6.75	\$9.13	\$4.10	\$101.37	.....	\$9.00	\$302.55	\$6,999.75	\$3,197.85	\$22.26	.....	\$854.00	\$577.82	\$317.90	\$50.09	\$281.27	.....	\$36,923.79	\$2,230.91	\$23,559.20	\$3,418.74	\$1,558.80	\$8.00	\$7,008.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....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TABLE NO. 4.

STATEMENT SHOWING AMOUNT PAID THE CITY TREASURER AND  
WARRANTS DRAWN AGAINST SAME FROM JAN. 1, 1897, TO DEC.  
31, 1897.

1897.			
Jan.	2....	Balance in treasury as per last report.....	\$9,744.73
Jan.	2....	Cash.....	\$3,000.00
Jan.	5....	Cash.....	6,000.00
Jan.	6....	Cash.....	6,000.00
Jan.	8....	Cash.....	5,000.00
Jan.	11....	Cash.....	3,000.00
Jan.	13....	Cash.....	1,000.00
Jan.	15....	Cash.....	1,000.00
Jan.	20....	Cash.....	1,000.00
Jan.	22....	Cash.....	1,000.00
Jan.	30....	Cash.....	2,000.00
			<hr/>
Feb.	4....	Cash.....	\$1,000.00
Feb.	6....	Cash.....	1,000.00
Feb.	11....	Cash.....	1,000.00
Feb.	13....	Cash.....	1,000.00
Feb.	16....	Cash.....	1,000.00
Feb.	17....	Cash.....	1,000.00
Feb.	18....	Cash.....	3,000.00
Feb.	20....	Cash.....	1,000.00
Feb.	25....	Cash.....	1,000.00
Feb.	26....	Cash.....	1,000.00
Feb.	27....	Cash.....	2,000.00
			<hr/>
			\$29,000.00
Mar.	4....	Cash.....	\$5,000.00
Mar.	6....	Cash.....	10,000.00
Mar.	8....	Cash.....	5,000.00
Mar.	10....	Cash.....	2,000.00
Mar.	12....	Cash.....	2,000.00
Mar.	16....	Cash.....	3,000.00
Mar.	16....	From county treasurer on account of frontage tax	11,441.24
Mar.	18....	Cash.....	1,000.00
Mar.	24....	Cash.....	5,000.00
Mar.	29....	Cash.....	2,000.00
			<hr/>
			\$46,441.24
April	6....	Cash.....	\$1,000.00
April	9....	Cash.....	1,000.00
April	10....	Cash.....	1,000.00
April	14....	Cash.....	1,000.00
April	17....	Cash.....	1,000.00
April	20....	Cash.....	500.00
April	28....	Cash.....	1,000.00
April	30....	Cash.....	1,500.00
			<hr/>
			\$8,000.00
May	1....	Cash.....	\$500.00
May	6....	Cash.....	1,000.00
May	7....	Cash.....	1,000.00
May	8....	Cash.....	500.00
May	15....	Cash.....	1,000.00
May	17....	Cash.....	1,000.00
May	25....	Cash.....	1,000.00
May	26....	From county treasurer on account of frontage tax	15,000.00
May	31....	Cash.....	500.00
			<hr/>
			\$21,500.00
June	3....	Cash.....	\$1,000.00
June	5....	Cash.....	1,000.00
June	7....	Cash.....	1,000.00
June	9....	Cash.....	1,000.00
June	15....	Cash.....	1,000.00
June	16....	Cash.....	1,000.00
June	22....	Cash.....	1,000.00
June	24....	Cash.....	2,000.00
June	26....	From county treasurer on account of frontage tax	50,000.00
June	29....	Cash.....	1,000.00
June	30....	Cash.....	1,000.00
			<hr/>
			\$61,000.00



TABLE NO. IV.—Continued.

July 7....	Cash.....	\$10,000.00	
July 9....	Cash.....	5,000.00	
July 13....	Cash.....	3,000.00	
July 19....	Cash.....	2,000.00	
July 23....	Cash.....	1,000.00	
July 28....	Cash.....	1,000.00	
July 29....	From county treasurer on account of frontage tax	23,461.12	
July 31....	Cash.....	1,000.00	
Aug. 5....	Cash.....	\$1,000.00	\$46,461.12
Aug. 7....	Cash.....	1,000.00	
Aug. 11....	Cash.....	1,000.00	
Aug. 12....	Cash.....	1,000.00	
Aug. 17....	Cash.....	1,000.00	
Aug. 19....	Cash.....	1,000.00	
Aug. 20....	Cash.....	1,000.00	
Aug. 23....	Cash.....	1,000.00	
Aug. 27....	Cash.....	1,000.00	
Aug. 30....	Cash.....	2,000.00	
Sept. 3....	Cash.....	\$5,000.00	\$11,000.00
Sept. 7....	Cash.....	10,000.00	
Sept. 10....	Cash.....	5,000.00	
Sept. 11....	Cash.....	2,000.00	
Sept. 13....	Cash.....	2,000.00	
Sept. 14....	Cash.....	3,000.00	
Sept. 16....	Cash.....	2,000.00	
Sept. 18....	Cash.....	2,000.00	
Sept. 22....	Cash.....	1,000.00	
Sept. 24....	Cash.....	2,000.00	
Sept. 27....	Cash.....	1,000.00	
Oct. 4....	Cash.....	\$2,000.00	\$35,000.00
Oct. 6....	Cash.....	2,000.00	
Oct. 11....	Cash.....	1,000.00	
Oct. 12....	Cash.....	1,000.00	
Oct. 14....	Cash.....	2,000.00	
Oct. 20....	Cash.....	1,000.00	
Oct. 22....	Cash.....	1,000.00	
Oct. 26....	Cash.....	500.00	
Oct. 27....	Cash.....	500.00	
Nov. 4....	Cash.....	\$1,000.00	\$11,000.00
Nov. 6....	Cash.....	1,000.00	
Nov. 9....	Cash.....	1,000.00	
Nov. 11....	Cash.....	1,000.00	
Nov. 16....	Cash.....	2,000.00	
Nov. 19....	Cash.....	1,000.00	
Nov. 20....	From county treasurer on account of frontage tax	6,545.99	
Nov. 29....	Cash.....	1,000.00	
Dec. 4....	Cash.....	\$1,000.00	\$14,545.99
Dec. 6....	Cash.....	1,000.00	
Dec. 13....	Cash.....	1,000.00	
Dec. 16....	Cash.....	1,000.00	
Dec. 22....	Cash.....	1,000.00	
Dec. 28....	Cash.....	1,510.76	
		\$6,510.76	
Total .....			\$304,459.11
			\$314,203.84

TABLE NO. 5.

WARRANTS DRAWN ON CITY TREASURER FROM JAN. 1, 1897, TO DE-  
CEMBER, 31, 1897, INCLUSIVE.

1897.			
Jan.	1. Warrant No. 8480.....	\$3,701.42	
Jan.	5. Warrant No. 8481.....	5,850.00	
Jan.	9. Warrants Nos. 8482 to 8517 inclu.	4,498.71	
Jan.	22. Warrants Nos. 8518 to 8527 inclu.	440.49	
			\$14,490.62
Feb.	1. Warrant No. 8528 .....	\$3,333.22	
Feb.	8. Warrants Nos. 8529 to 8571 inclu.	20,409.96	
Feb.	13. Warrant No. 8572 .....	300.00	
			\$24,043.18
Mar.	1. Warrant No. 8573 .....	\$3,227.09	
Mar.	9. Warrants Nos. 8574 to 8647 inclu.	27,167.34	
Mar.	16. Warrant No. 8648 .....	15,000.00	
Mar.	26. Warrants Nos. 8649 to 8652 inclu.	1,025.30	
			\$46,419.73
April	1. Warrant No. 8653 .....	\$3,012.17	
April	9. Warrants Nos. 8654 to 8700 inclu.	11,493.73	
April	20. Warrant No. 8701 .....	5,000.00	
			\$19,505.90
May	1. Warrant No. 8702 .....	\$3,199.36	
May	7. Warrants Nos. 8703 to 8755 inclu.	2,139.92	
May	19. Warrants Nos. 8756 to 8776 inclu.	1,535.43	
May	25. Warrant No. 8777 .....	7,000.00	
			\$13,874.71
June	1. Warrant No. 8778 .....	\$4,225.76	
June	3. Warrants Nos. 8779 to 8819 inclu.	1,907.99	
June	22. Warrants Nos. 8820 to 8845 inclu.	7,423.20	
June	26. Warrant No. 8846 .....	50,000.00	
			\$63,556.95
July	1. Warrant No. 8847 .....	\$3,945.42	
July	9. Warrants Nos. 8848 to 8894 inclu.	8,880.84	
			\$12,826.26
Aug.	2. Warrants Nos. 8895 to 8916 inclu.	\$12,048.91	
Aug.	9. Warrants Nos. 8917 to 8968 inclu.	6,031.97	
			\$18,080.88
Sept.	1. Warrants Nos. 8969 to 8990 inclu.	\$14,106.28	
Sept.	9. Warrants Nos. 8991 to 9039 inclu.	20,261.50	
			\$43,367.78
Oct.	1. Warrants Nos. 9040 to 9058 inclu.	\$14,326.70	
Oct.	9. Warrants Nos. 9059 to 9116 inclu.	5,760.99	
			\$20,087.69
Nov.	1. Warrants Nos. 9117 to 9130 inclu.	\$12,144.70	
Nov.	9. Warrants Nos. 9131 to 9186 inclu.	2,217.61	
			\$14,362.31
Dec.	1. Warrants Nos. 9187 to 9203 inclu.	\$4,481.74	
Dec.	15. Warrants Nos. 9204 to 9268 inclu.	4,283.76	
			\$8,765.50
Grand total .....			\$299,381.51
Balance .....			\$14,822.33

TABLE NO. 6.

CONTRACTS MADE BY THE BOARD OF WATER COMMISSIONERS FROM  
JAN. 1, 1897, TO DEC. 31, 1897.

No.	Date of Contract.	With Whom and for What Purpose.	Am't of Contract.	Amount Paid.	Amount Due.
1	Feb. 10.	Lyle M. Fisher, printing annual report for 1896.....	\$335.80	\$335.80	
2	Mar. 27.	The Crane & Ordway Co., brass goods .....	529.60	529.60	
3	Mar. 27.	The Crane & Ordway Co., lead pipe and block tin.....	1,573.61	1,573.61	
4	Mar. 30.	Dwyer Plumbing & Heating Co., stopcock boxes.....	943.50	943.50	
5	April 1.	Bingham & Taylor, Buffalo, N. Y., valve boxes .....	613.78	613.78	
6	April 24.	Joseph Lamotte, fencing right of way, Centerville.....	703.71	703.71	
7	May 5.	E. P. Allis & Co., Milwaukee, Wis., 10-million engine, McCarron station .....	22,700.00		\$22,700.00
8	May 22.	Henry Orme, special castings for city extensions .....	664.75	664.75	
9	May 22.	Fairbanks, Morse & Co., laying water mains on Smith avenue between Goodrich and McBoal.....	651.00	585.90	65.10
10	May 22.	Fairbanks, Morse & Co., laying and re-laying water mains.....	4,826.65	4,343.99	482.66
11	May 22.	P. H. Thornton, laying water mains .....	422.67	380.40	42.27
12	May 22.	South Park Foundry & Machine Co., fire hydrants.....	788.50	788.50	
13	May 22.	South Park Foundry & Machine Co., water gates .....	1,020.50	1,020.50	
14	June 4.	Chas. A. Fuller, 8 tons pig lead....	518.98	518.98	
15	June 3.	Jas. Shiely, drayage.....	282.71	226.17	56.54
16	Mar. 26.	Pittsburg Meter Co., Pittsburg, Pa., water meters .....	5,442.00	4,966.00	476.00
17	June 3.	South Pittsburg Pipe Works, South Pittsburg, Tenn., cast iron pipe..	7,154.11	7,154.11	
18	May 27.	Robert W. Hunt & Co., Chicago, Ill., inspecting 10-million pump, McCarron station .....	800.00		800.00
19	June 4.	South Park Foundry & Machine Co., sprinkling attachment for hydrants, sluice gate and special flange connection .....	545.30	545.30	
20	July 1.	N. W. Fuel Co., coal and wood....	4,780.00	1,180.75	3,599.25
21	July 6.	Gillette-Herzog Mfg. Co., Minneapolis, weir tank, high service reservoir .....	400.00	400.00	
22	Aug. 25.	Builders' Iron Foundry, Providence, R. I., Venturi meter, 30-inch.....	1,151.75		1,151.75
23	Aug. 27.	W. H. Jackson, White Bear, dwelling house, Centerville.....	1,474.00	1,474.00	
24	Oct. 23.	Jno. Kenny, boiler for McCarron station .....	1,223.00		1,223.00
25	Oct. 25.	Howard-Harrison Iron Co., cast iron specials .....	945.50		945.50
26	Dec. —.	G. F. Moulton, 25,000 paving brick.	350.00		350.00
27	Dec. 6.	Kettle River Sandstone Co., stone for 10-million gallon pumping engine .....	548.00		548.00
			\$61,389.42	\$28,949.35	\$32,440.07

TABLE NO. 6.—Continued.

CONTRACTS MADE PREVIOUS TO DEC. 31, 1896, AND FOR WHICH FINAL SETTLEMENT WAS NOT MADE AT TIME OF LAST REPORT.

Date of Contract.	With Whom and for What Purpose.	Am't Due Dec. 1, 1896	Amount Paid.	Amount Due.
July 17, 1895.	Ransome Subway Co., Chicago, conduit to Otter lake.....	\$413.29	\$413.29	
April 29, 1896.	E. P. Allis & Co., Milwaukee, pumping engine, Centerville.....	10,350.00	10,000.00	\$350.00
May 19.	J. T. Million, laying water mains on Duke street.....	114.22	114.22	
May 20.	Patrick Doherty, laying water mains in city.....	344.05	344.05	
May 20.	Hennessy & Cox, wooden conduit to Centerville.....	1,500.00		1,500.00
July 8.	Hennessy & Cox, pump house at Centerville .....	50.00		50.00
July 8.	John Kenny, boiler McCarron Lake station .....	176.50	176.50	
July 25.	Fairbanks, Morse & Co., laying 36-inch water pipes .....	700.61	700.61	
Sept. 28.	S. Swanson, two artesian wells at Vadnais lake .....	1,095.20	1,095.20	
Oct. 10.	John Kenny, smoke stack, Centerville station .....	270.00	270.00	
Oct. 14.	Nic. Feyen, grading on Centerville conduit .....	50.00	50.00	
Oct. 29.	N. W. Fuel Co., coal and wood....	4,136.42	4,136.42	
Oct. 29.	Pioneer Fuel Co., coal for Vadnais station .....	202.50	202.50	
		\$19,402.79	\$17,502.79	\$1,900.00

TABLE NO. 7.

## BOND ACCOUNT JANUARY 1, 1898.

Date of Legislative Act Authorizing Issue of Bonds.	Amount of Bonds Au- thorized.	Date of Bonds Issued.	When Due.	Amount of Bonds Issued.	Rate.	INTEREST PAYABLE.											Total Annual Interest		
						Dec. 1.	Jan. 2.	Feb. 1.	Mar. 2.	April 1,	May 2.	June 1.	July 2.	Aug. 1.	Sept. 1.	Oct. 1.		Nov. 2.	
Feb. 10, 1881	\$600,000	June 1, 1882	30 years	\$350,000	4 per cent	\$7,000													\$14,000
Jan. 26, 1883	500,000	Aug. 1, 1883	30 years	150,000	5 per cent			\$3,750							\$3,750				7,500
Feb. 21, 1885	800,000	April 1, 1884	25 & 30 years	600,000	5 per cent					\$15,000							\$15,000		30,000
Jan. 31, 1887	200,000	April 1, 1885	30 years	400,000	5 per cent					10,000							10,000		20,000
Jan. 31, 1887	160,000	May 2, 1887	30 years	200,000	4½ per cent							\$4,500						\$4,500	9,000
Mar. 29, 1889	300,000	Mar. 1, 1888	30 years	300,000	4½ per cent				\$6,750							\$6,750			13,500
		Jan. 1, 1889	30 years	100,000	4½ per cent		\$2,250							\$2,250					4,500
		Jan. 2, 1889	30 years	160,000	4½ per cent		3,600							3,600					7,200
		May 1, 1889	30 years	100,000	4½ per cent							2,250						2,250	4,500
		May 1, 1890	30 years	100,000	4 per cent							2,000						2,000	4,000
	2,560,000			\$2,460,000		\$7,000	\$5,850	\$3,750	\$6,750	\$25,000	\$8,750	\$7,000	\$5,850	\$3,750	\$6,750	\$25,000	\$8,750	\$114,200	



TABLE NO. 8.

## STATEMENT SHOWING AMOUNT DUE THE BOARD OF WATER COMMISSIONERS ON DEC. 31, 1897, FROM CITY OF ST. PAUL.

Water for fire purposes from Dec. 1, 1891, to June 1, 1892.....	\$28,401.53		
Water for fire purposes from June 1, 1892, to Dec. 1, 1892.....	29,229.79		
Water for fire purposes from Dec. 1, 1892, to June 1, 1893.....	30,546.89		
Water for fire purposes from June 1, 1893, to Dec. 1, 1893.....	31,607.77		
Water for fire purposes from Dec. 1, 1893, to June 1, 1894.....	31,773.12		
Water for fire purposes from June 1, 1894, to Dec. 1, 1894.....	32,307.00		
Water for fire purposes from Dec. 1, 1894, to June 1, 1895.....	32,700.16		
Water for fire purposes from June 1, 1895, to Dec. 1, 1895.....	33,204.95		
Water for fire purposes from Dec. 1, 1895, to June 1, 1896.....	33,341.84		
Water for fire purposes from June 1, 1896, to Dec. 1, 1896.....	33,509.57		
Water for fire purposes from Dec. 1, 1896, to June 1, 1897.....	33,663.27		
Water for fire purposes from June 1, 1897, to Dec. 1, 1897.....	33,823.91		
		\$384,109.80	
Premiums received and retained by city on the \$160,000 of bonds issued in January, 1889, to redeem the bonds of the old St. Paul Water Co. of like amount assumed by the city at the time of the purchase of the works.....		5,393.77	
Relaying of water mains caused by change of grade—			
On Mt. Airy between Valley and Warren .....	\$248.12		
On Fairview between Jackson and Mt. Airy .....	134.25		
On East Sixth between Maria and Hoffman .....	399.75		
On East Sixth between Broadway and Olive .....	674.37		
On Flandrau at Harvester.....	65.00		
Changing main at Como bridge.....	760.58		
		2,282.07	
Balance for park fountains, 1894. \$340.00			
For water for park fountains, all 1895.....	815.00		
For water for park fountains, all 1896.....	855.00		
For water for drinking fountains, all 1896.....	362.00		
For water for parks and drinking fountains for 1897.....	\$1,656.00		
	\$4,028.00		
		\$4,028.00	
Repairing water mains broken by sewer contractors (claims filed with city comptroller).....			\$395,813.64
Balance frontage tax assessment for 1890 and prior .....			114.14
Balance frontage tax assessment for 1891.....	\$3,629.30		
Balance frontage tax assessment for 1892.....	1,706.22		
Balance frontage tax assessment for 1893.....	1,106.86		
Balance frontage tax assessment for 1893.....	717.54		
Balance frontage tax assessment for 1894.....	6,591.87		
Balance frontage tax assessment for 1895.....	11,748.07		
Balance frontage tax assessment for 1896.....	30,116.70		
For frontage tax assessment for 1897.....	104,052.58		
		\$159,669.14	
From builders .....		100.00	
From service connections.....		112.50	
Street sprinkling 1895.....		949.47	
Street sprinkling 1896.....		2,204.66	
Street sprinkling 1897.....		12,576.39	
			\$15,943.02
Total .....			\$571,539.94

TABLE NO. 9.  
FRONTAGE TAX ACCOUNT COLLECTIONS—BALANCE DUE JAN. 1, 1898.

RECEIPTS FOR YEARS.	1890 and Prior.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	Total.
March 16, 1897.....	\$12.99	\$17.46	\$73.18	\$17.65	\$602.01	\$7,370.47	\$3,347.48	.....	\$11,441.24
May 26, 1897.....	.....	.....	.....	.....	.....	.....	15,000.00	.....	15,000.00
June 26, 1897.....	.....	.....	.....	.....	.....	.....	50,000.00	.....	50,000.00
July 29, 1897.....	.....	.....	103.31	81.00	937.44	8,578.16	13,761.21	.....	23,461.12
Nov. 20, 1897.....	.....	.....	.....	.....	170.40	3,675.81	2,639.78	.....	6,545.99
Total receipts .....	\$12.99	\$17.46	\$176.49	\$98.65	\$1,700.85	\$19,624.44	\$84,808.47	.....	\$106,448.35
Amount due Jan. 1, 1897, as per last report .....	\$3,642.29	\$1,723.68	\$1,283.35	\$816.19	\$8,301.72	\$31,372.51	\$114,925.17	.....	\$162,004.91
Amount of 1897 assessment collectible in 1898 .....	.....	.....	.....	.....	.....	.....	.....	\$104,052.58	\$55,616.56 104,052.58
Amount due Jan. 1, 1898....	\$3,629.30	\$1,706.22	\$1,106.86	\$717.54	\$6,591.87	\$11,748.07	\$30,116.70	\$104,052.58	\$159,669.14

TABLE NO. 10.  
SINKING FUND INVESTMENTS IN TAX LEVY CERTIFICATES AND CITY BONDS.

DATE OF INVESTMENT.	DATE OF CERTIFICATES.	WHEN DUE.	CERTIFICATE NUMBERS.	No. of Cert.	Interest.	Amount of Certificates.
Mar. 1, 1897.....	Mar. 1, 1897.....	Mar. 1, 1907.....	1 city bond .....	1	1 1/4 %	\$100,000.00
June 9, 1897.....	June 15, 1897.....	Nov. 15, 1898.....	1425 to 2032 inclusive..	608	1 1/4 %	304,000.00
Sept. 1, 1897.....	Sept. 1, 1897.....	Sept. 1, 1907.....	1 city bond .....	1	1 1/4 %	50,000.00
Amount uninvested .....	.....	.....	.....	.....	.....	\$454,000.00
					.....	*\$7,525.08

\*This was invested Jan. 15, 1898, in 4 % city tax levy certificates.

TABLE NO. 11.

PAY ROLL FOR YEAR INCLUDES SALARIES OF OFFICERS, ENGINEERS, FIREMEN, INSPECTORS AND LABORERS.			SALARIES OF ENGINEERS, FIREMEN AND KEEPERS AT THE VARIOUS STATIONS.						
MONTH.	No. of Men.	Total Amount of Pay Roll.	McCarren Lake Station.	Vadnais Lake Station.	Baldwin Lake Station.	West St. Paul Station.	Centerville Station.	Reservoir.	Total.
1896.									
December .....	89	\$3,701.42	\$300.00	\$50.00	.....	\$110.00	\$120.00	\$25.00	\$605.00
1897.									
January .....	81	3,333.22	300.00	50.00	.....	110.00	81.50	25.00	566.50
February .....	78	3,227.09	300.00	50.00	.....	110.00	50.00	25.00	535.00
March .....	74	3,012.17	300.00	50.00	.....	110.00	60.00	25.00	550.00
April .....	83	3,139.36	300.00	50.00	.....	110.00	60.00	40.00	565.00
May .....	101	4,225.76	300.00	50.00	5.00	110.00	60.00	40.00	565.00
June .....	113	3,945.42	300.00	50.00	5.00	110.00	60.00	40.00	565.00
July .....	108	4,032.94	300.00	50.00	5.00	110.00	60.00	40.00	565.00
August .....	92	4,056.31	300.00	50.00	.....	110.00	101.00	40.00	601.00
September .....	106	4,188.09	300.00	110.00	.....	110.00	71.00	40.00	631.00
October .....	116	4,348.84	300.00	110.00	5.00	110.00	60.00	40.00	625.00
November .....	99	3,732.72	300.00	84.00	5.00	110.00	60.00	25.00	584.00
Total .....	1,140	\$45,003.34	\$3,600.00	\$754.00	\$35.00	\$1,320.00	\$843.50	\$405.00	\$6,957.50

TABLE NO. 12.

THE FOLLOWING TABLE SHOWS THE NUMBER OF APPLICATIONS  
MADE FOR WATER SERVICES ANNUALLY FROM 1869 TO DATE.

YEAR.	High Service.	Low Service.	Total.
1869 .....	.....	34	2,426
1870 .....	.....	321	
1871 .....	.....	250	
1872 .....	.....	164	
1873 .....	.....	131	
1874 .....	.....	153	
1875 .....	.....	95	
1876 .....	.....	85	
1877 .....	.....	67	
1878 .....	.....	50	
1879 .....	.....	180	
1880 .....	.....	167	
1881 .....	.....	164	
1882 .....	.....	264	
1883 .....	.....	301	
1884 .....	164	336	500
1885 .....	644	365	1,009
1886 .....	639	369	1,008
1887 .....	747	325	1,072
1888 .....	812	406	1,218
1889 .....	1,327	491	1,818
1890 .....	1,071	336	1,407
1891 .....	811	264	1,075
1892 .....	671	210	881
1893 .....	474	151	625
1894 .....	363	139	502
1895 .....	390	311	701
1896 .....	384	156	540
1897 .....	332	98	430
	8,829	6,383	15,212

TABLE NO. 13.

## PUMPING PLANTS.

EXPENSE MAINTAINING THE FIVE (5) PUMPING STATIONS AND RES-  
ER VOIR.

Station.	Salaries.	Fuel.	Waste and Mach. Oil.	Supplies & Repairs.	Kerosene Oil.	Total.
McCarron Lake..	\$3,600.00	\$3,888.07	\$237.45	\$101.68	.....	\$7,827.20
Baldwin Lake...	35.00	.....	.....	.....	.....	35.00
Vadnais Lake...	754.00	479.83	6.59	46.92	\$9.81	1,297.15
West St. Paul....	1,320.00	361.22	5.36	42.86	11.60	1,741.04
Centerville .....	843.50	1,764.85	35.92	2.58	9.54	2,656.39
Reservoir .....	405.00	.....	.....	.....	.....	405.00
	\$6,957.50	\$6,493.97	\$285.32	\$194.04	\$30.95	\$13,961.78



TABLE NO. 14.  
METERS IN SERVICE JAN. 1, 1898.

KIND OF METER.	SIZE.								Total.
	½	⅝	¾	1	1½	2	3	4	
Worthington (improved).....		114	119	33	43	7	4	2	322
Worthington (old style).....		6	15	9	8	2			40
Union (rotary).....		82	21	13	7	2	2	3	130
Union (piston).....			1	1					2
Columbia .....		6							6
Nash .....		11	2	1					14
Nash "A".....		16							16
Nash "AA".....		60							60
Crown .....		74	18	26	34	10	1	2	165
Crown "AA".....		553		17	4				574
Empire .....	14	20	45	35		8		1	123
Empire "A".....		5	4	2					11
Gem .....							1	1	2
Thomson .....		18	6	2					26
Thomson "B".....	1	49	12	4	2	2			70
Lambert .....		2							2
Lambert "A".....		1	2						3
Hersey .....		31	39	29	25	11	2		137
Hersey disc.....		3			1	1			5
Frost .....			1						1
Trident .....		58	2	1					61
Westinghouse .....		4		4	1	1			10
Pittsburg disc.....		496	8	11	4	1			520
Totals .....	15	1,609	295	188	129	45	10		9,230

TABLE NO. 15.

Shut off and Turned on water from Jan. 1, 1897, to Jan. 1, 1898.

	High Service.	Low Service.	Total.
Shut off for repairs.....	248	250	498
Shut off for non-payment.....	232	190	422
Shut off for vacant premises.....	641	475	1,116
Shut off for violation of rules.....	5	5	10
Totals .....	1,126	920	2,046
Turned on old services.....	1,094	839	1,933
Turned on new services.....	329	103	432
Turned on for builders.....			24
Totals .....	1,423	942	2,389

Total services shut off and turned on for year ending:

December 1, 1884.....	1,014	December 1, 1891.....	4,743
December 1, 1885.....	2,311	December 1, 1892.....	4,470
December 1, 1886.....	2,384	December 1, 1893.....	4,477
December 1, 1887.....	2,541	December 1, 1894.....	4,932
December 1, 1888.....	2,833	December 1, 1895.....	4,696
December 1, 1889.....	3,978	December 31, 1896.....	4,373
December 1, 1890.....	3,919	December 31, 1897.....	4,435

TABLE NO. 16.

SHOWING THE DIFFERENT KINDS AND SIZES OF METERS BELONGING TO THE CITY AND PRIVATE PARTIES IN SERVICE AND ON HAND DEC. 31, 1897.

KIND OF METERS.	Size in Inches.	PROPERTY OF CITY.			PRIVATE PROPERTY.			Grand Total of Meters in Service.	Grand Total of Meters in Shop.	Grand Total of all Meters.
		In Service.	At Work Shop.	Total.	In Service.	At Work Shop.	Total.			
Worthington improved	4	..	..	..	2	..	2	2	..	2
Worthington improved	3	..	..	..	4	..	4	4	..	4
Worthington improved	2	2	..	2	5	..	5	7	..	7
Worthington improved	1½	38	2	40	5	..	5	43	12	45
Worthington improved	1	31	1	32	2	..	2	33	1	34
Worthington improved	¾	117	2	119	2	..	2	119	2	121
Worthington improved	⅝	94	1	95	20	..	20	114	1	115
Worthington old style	3	..	3	3	..	..	..	..	3	3
Worthington old style	2	2	..	2	..	..	..	2	..	2
Worthington old style	1½	8	1	9	..	..	..	8	1	9
Worthington old style	1	8	2	10	1	..	1	9	2	11
Worthington old style	¾	15	..	15	..	..	..	15	..	15
Worthington old style	⅝	6	..	6	..	..	..	6	..	6
Union rotary	4	3	..	3	..	..	..	3	..	3
Union rotary	3	2	..	2	..	..	..	2	..	2
Union rotary	2	2	..	2	..	..	..	2	..	2
Union rotary	1½	6	..	6	1	..	1	7	..	7
Union rotary	1	13	..	13	..	..	..	13	..	13
Union rotary	¾	21	2	23	..	..	..	21	2	23
Union rotary	⅝	82	..	82	..	..	..	82	..	82
Union piston	1	1	..	1	..	..	..	1	..	1
Union piston	¾	1	..	1	..	..	..	1	..	1
Columbia	⅝	6	..	6	..	..	..	6	..	6
Nash	1	..	..	..	1	..	1	1	..	1
Nash	¾	2	1	3	..	..	..	2	1	3
Nash	⅝	10	..	10	1	..	1	11	..	11
Nash "A"	⅝	16	..	16	..	..	..	16	..	16
Nash "AA"	⅝	60	..	60	..	..	..	60	..	60
Crown	4	2	..	2	..	..	..	2	..	2
Crown	3	1	..	1	..	..	..	1	..	1
Crown	2	9	..	9	1	..	1	10	..	10
Crown	1½	34	..	34	..	..	..	34	..	34
Crown	1	26	2	28	..	..	..	26	2	28
Crown	¾	18	..	18	..	..	..	18	..	18
Crown	⅝	72	..	72	2	..	2	74	..	74
Crown	1	..	1	1	..	..	..	..	1	1
Crown "AA"	1½	4	..	4	..	..	..	4	..	4
Crown "AA"	1	17	..	17	..	..	..	17	..	17
Crown "AA"	⅝	553	3	556	..	..	..	553	3	556
Empire	4	1	..	1	..	..	..	1	..	1
Empire	2	8	1	9	..	..	..	8	1	9
Empire	1	35	1	36	..	..	..	35	1	36
Empire	¾	45	1	46	..	..	..	45	1	46
Empire	⅝	20	..	20	..	..	..	20	..	20
Empire	½	14	..	14	..	..	..	14	..	14
Empire "A"	1	2	..	2	..	..	..	2	..	2
Empire "A"	¾	4	1	5	..	..	..	4	1	5
Empire "A"	⅝	5	..	5	..	..	..	5	..	5
Empire "AA"	⅝	1	..	1	..	..	..	1	..	1
Gem	4	..	..	..	1	..	1	1	..	1
Gem	3	1	..	1	..	1	1	1	1	2
Thomson	1	2	..	2	..	..	..	2	..	2
Thomson	¾	6	2	8	..	..	..	6	2	8
Thomson	⅝	18	..	18	..	..	..	18	..	18
Thomson "B"	2	1	..	1	1	..	1	2	..	2
Thomson "B"	1½	2	..	2	..	..	..	2	..	2
Thomson "B"	1	4	1	5	..	..	..	4	1	5
Thomson "B"	¾	12	..	12	..	..	..	12	..	12
Thomson "B"	⅝	49	1	50	..	..	..	49	1	50
Thomson "B"	½	1	..	1	..	..	..	1	..	1
Lambert	⅝	2	2	4	..	..	..	2	2	4
Lambert "A"	¾	2	..	2	..	..	..	2	..	2
Lambert "A"	⅝	1	..	1	..	..	..	1	..	1

TABLE NO. 16—Continued.

KIND OF METERS.	Size in Inches.	PROPERTY OF CITY.			PRIVATE PROPERTY.			Grand Total of Meters in Service.	Grand Total of Meters in Shop.	Grand Total of all Meters.
		In Service.	At Work Shop.	Total.	In Service.	At Work Shop.	Total.			
Hersey .....	3	2	...	2	...	...	...	2	...	2
Hersey .....	2	11	1	12	...	...	...	11	1	12
Hersey .....	1½	25	...	25	...	...	...	25	...	25
Hersey .....	1	29	...	29	...	...	...	29	...	29
Hersey .....	¾	39	...	39	...	...	...	39	...	39
Hersey .....	⅝	31	1	32	...	...	...	31	1	32
Hersey disc.....	2	1	...	1	...	...	...	1	...	1
Hersey disc.....	1½	1	...	1	...	...	...	1	...	1
Hersey disc.....	⅝	3	...	3	...	...	...	3	...	3
Frost .....	¾	1	...	1	...	...	...	1	...	1
Sport .....	⅝	...	1	1	...	...	...	...	1	1
Trident .....	1	1	...	1	...	...	...	1	...	1
Trident .....	¾	2	...	2	...	...	...	2	...	2
Trident .....	⅝	58	1	59	...	...	...	58	1	59
Westinghouse .....	2	1	...	1	...	...	...	1	...	1
Westinghouse .....	1½	1	...	1	...	...	...	1	...	1
Westinghouse .....	1	4	1	5	...	...	...	4	1	5
Westinghouse .....	⅝	4	...	4	...	...	...	4	...	4
Pittsburg disc .....	2	1	...	1	...	...	...	1	...	1
Pittsburg disc .....	1½	4	2	6	...	...	...	4	2	6
Pittsburg disc .....	1	11	1	12	...	...	...	11	1	12
Pittsburg disc .....	¾	8	2	10	...	...	...	8	2	10
Pittsburg disc .....	⅝	496	53	549	...	...	...	496	53	549
Totals .....		2251	95	2346	49	1	50	2300	96	2396

TABLE NO. 17.

EXPENSE FOR MAINTAINING PUMPING STATIONS AND RESERVOIR FOR YEARS 1891-2-3-4-5-6 AND 7, McCAR-  
RON LAKE STATION.

Year.	Salaries.	Fuel.	Machine Oil and Waste.	Repairs and Supplies.	Kerosene Oil.	Total.	WATER PUMPED.		FUEL, COAL, ETC.		Daily Increase in Pumping, Gallons.
							Annually.	Daily.	Annually.	Daily.	
1891	\$3,540.00	\$4,702.12	\$213.86	\$230.66	\$38.50	\$8,725.14	1,106,034.800	3,030,232	2,134,000	5,845	871,090
1892	3,575.00	5,400.89	302.36	37.82	36.75	9,352.82	1,071,130.320	2,934,603	2,036,734	5,580	623,070
1893	3,593.00	5,413.30	279.56	329.46	Electric.	9,615.32	1,298,531.200	3,557,674	2,147,888	5,884	326,000
1894	3,706.50	5,012.85	237.99	351.12	5.20	9,313.66	1,300,813.800	3,882,110	2,345,731	6,427	338,669
1895	3,652.00	5,034.79	243.57	269.09	5.20	9,204.65	1,536,912.600	4,210,719	2,536,020	6,948	*50,708
1896 (13 mos.)	3,747.00	5,963.64	292.40	305.74	.....	10,308.78	1,651,524.200	4,160,011	2,751,698	6,915	
1897	3,600.00	3,888.07	237.45	101.68	.....	7,827.20	1,280,312,340	3,507,705	2,074,208	5,682	*652,306

\* Decrease.

## BALDWIN LAKE STATION.

Year.	Salaries.	Fuel.	Machine Oil and Waste.	Repairs and Supplies.	Kerosene Oil.	Total.	WATER PUMPED.		FUEL, COAL, ETC.		Daily Increase in Pumping, Gallons.
							Annually.	Daily.	Annually.	Daily.	
1891	\$1,507.16	\$4,908.44	\$51.98	\$77.39	\$22.14	\$6,657.11	1,983,034.500	8,077,535	Coal 150,325 Wood 797 3/4	.....	.....
1892	1,062.08	941.00	56.28	56.12	11.00	2,127.39	1,153,794.000	9,470,286	Wood 576	.....	.....
1893	1,145.66	778.42	49.18	363.99	10.35	2,343.60	1,104,158.600	9,219,623	Wood 461 3/4	.....	.....
1894	1,245.66	1,182.05	49.80	251.63	10.30	2,739.44	1,449,360.900	9,662,406	Wood 660 1/2	4 1/2	.....
1895	1,450.00	2,524.46	23.77	45.19	27.08	4,070.50	1,914,949.800	8,824,653	Wood 821	4	.....
1896 (13 mos.)	1,564.70	1,697.88	17.88	14.40	15.93	3,310.79	1,917,058.000	9,271,715	Wood 841 1/4	4.3	.....
1897	35.00	.....	.....	.....	.....	35.00	.....	.....	.....	.....	.....

## PUMPING STATIONS AND RESERVOIR—Continued.

## VADNAIS LAKE STATION.

Year.	Salaries.	Fuel.	Machine Oil and Waste.	Repairs and Supplies.	Kerosene Oil.	Total.	WATER PUMPED.		FUEL, COAL, ETC.	
							Annually.	Daily.	Annually.	Daily.
1891	\$1,100.00	\$1,081.68	\$50.75	\$197.12	\$6.36	\$2,435.91	207,750,000		246,800	
1892	1,020.00	1,965.25	73.71	102.19	23.90	3,124.05				
1893	600.00			21.55		621.35				
1894	912.50	1,508.60	21.06	216.75	20.60	2,679.90	337,160,000		624,387	
1895	848.33	1,105.00	47.50	31.58	11.64	2,044.05	237,043,000		550,000	
1896 (13 mos.)	1,147.48	1,618.77	44.22	38.76	32.52	2,881.75	938,611,850	2,364,262	612,614	
1897	754.00	479.83	6.59	46.92	9.81	1,297.15	290,299,356	795,341	195,950	

## WEST ST. PAUL STATION.

1893	\$1,237.75	\$589.63	\$29.72	\$23.50	\$15.10	\$1,895.70	10,015,722	27,440	209,043	571
1894	1,320.00	328.96	2.88	28.83	14.20	1,694.87	9,123,480	24,990	169,220	463
1895	1,320.00	269.50	5.27	26.47	9.08	1,600.32	10,520,640	28,848	174,600	479
1896 (13 mos.)	1,430.00	529.88	4.58	33.37	12.00	2,009.83	13,497,120	33,998	212,200	535
1897	1,320.00	361.22	5.36	42.86	11.60	1,741.04	16,018,200	43,886	229,800	629

## CENTERVILLE STATION.

1897	\$843.50	\$1,764.85	\$35.92	\$2.58	\$9.54	\$2,656.39				
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## RESERVOIR.

Year.	Salaries.	Year.	Salaries.
1891	\$405.00	1895	\$405.00
1892	405.00	1896 (13 months)	430.00
1893	405.00	1897	405.00
1894	405.00		405.00



TABLE NO. 18.

## COMPARATIVE STATEMENT OF HOSE VIOLATIONS FOR 1894-5-6 AND 7.

VIOLATIONS.	1894.			1895.			1896.			1897.		
	High.	Low.	Total.	High.	Low.	Total.	High.	Low.	Total.	High.	Low.	Total.
Hose, 1 violation.....	200	129	329	136	87	223	155	46	201	91	9	100
Hose, 2 violations.....	28	16	44	5	1	6	10	3	13	1	1	2
Hose, 3 violations.....	13	7	20	1	.....	1	1	1	2	2	.....	2
Hose, 4 violations.....	2	3	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hose, 5 violations.....	1	2	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hose, 6 violations.....	1	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hose, 7 violations.....	2	1	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reel, 6 to 9 p. m., 1 violation.....	185	50	235	34	.....	34	61	4	65	37	1	38
Reel, 6 to 9 p. m., 2 violations.....	22	14	36	6	.....	6	1	.....	1	2	.....	2
Reel, 6 to 9 p. m., 3 violations.....	6	2	8	2	.....	2	1	.....	1	.....	.....	.....
Reel, 6 to 9 p. m., 4 violations.....	2	1	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reel, 6 to 9 p. m., 7 violations.....	.....	34	196	1	.....	1	40	3	43	26	9	35
Hose, all day, 1 violation.....	162	9	171	1	.....	1	.....	.....	.....	3	.....	3
Hose, all day, 2 violations.....	23	9	32	1	.....	1	.....	.....	.....	.....	.....	.....
Hose, all day, 3 violations.....	2	4	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hose, all day, 4 violations.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals .....	648	274	922	188	88	276	269	57	326	163	19	182

TABLE NO. 19.

STATEMENT SHOWING THE NUMBER OF MILES OF PIPE LAID ANNUALLY TO DATE, EXPENSE OF SAME, FRONTAGE TAX, ETC.

	MAINS LAID.			Expenditure on Account of Laying Mains.	Construction Outside of City.	Annual Maintenance	Number of Applications for Taps.	Annual Receipts from Consumers.	Increase.	Frontage Tax Receipts.	Number of Fire Hydrants in Use.	Frontage Tax Assessment.	Years Frontage Tax Has Been Paid Incl. 1894.	Years More to Pay on Basis of 10 Years.
	Miles.	Feet.												
To Aug. 10, 1882.	23	1,662					2,007				188			
From Aug. 10, '82, to Dec. 1, '82	3	793		a \$12,300.44	\$1,566.80	\$1,074.58	118				198			
From Dec. 1, '82, to Dec. 1, '83	4	807		61,003.97	100,021.19	6,854.30	301				236			
From Dec. 1, '83, to Dec. 1, '84	16	1,220		157,189.31	609,686.93	11,473.84	500				315	\$12,852.76	11	
From Dec. 1, '84, to Dec. 1, '85	23	2,583		207,586.90	40,148.36	b 19,275.58	1,009				401	20,500.06	10	
From Dec. 1, '85, to Dec. 1, '86	18	3,334		138,694.54	19,657.46	17,976.64	1,008				673	33,787.08	8	1
From Dec. 1, '86, to Dec. 1, '87	20	2,207		225,443.70	32,975.47	22,806.58	1,072	\$106,635.23	\$12,976.71	\$12,976.71	808	46,388.88	7	2
From Dec. 1, '87, to Dec. 1, '88	28	3,392		285,018.19	97,736.31	23,739.81	1,218	112,720.01	6,084.18	6,084.18	1,134	58,609.10	6	3
From Dec. 1, '88, to Dec. 1, '89	35	4,983		237,080.58	80,690.69	26,122.69	1,818	124,920.90	12,200.89	12,200.89	1,471	76,706.21	5	4
From Dec. 1, '89, to Dec. 1, '90	20	4,083		211,013.64	26,026.29	c 36,082.75	1,407	138,913.61	13,992.71	13,992.71	1,748	99,080.96	4	5
From Dec. 1, '90, to Dec. 1, '91	5	3,686		46,029.69	38,937.07	38,473.82	1,075	159,561.29	20,648.48	20,648.48	1,813	117,947.95	3	6
From Dec. 1, '91, to Dec. 1, '92	14	928		e 118,343.20	41,327.25	35,349.12	881	171,164.69	11,603.40	11,603.40	2,067	135,386.46	2	7
From Dec. 1, '92, to Dec. 1, '93	8	1,946		63,325.15	4,590.62	36,404.84	625	177,595.21	6,430.62	6,430.62	2,067	135,386.46	1	8
From Dec. 1, '93, to Dec. 1, '94	6	646		42,287.17	6,198.62	d 39,139.72	502	179,246.52	279.20	279.20	2,131	143,001.73	1	9
From Dec. 1, '94, to Dec. 1, '95	8	13		f 81,360.58	24,624.65	39,006.14	701	190,714.78	11,468.26	11,468.26	2,200	125,374.26	1	10
From Dec. 1, '95, to Dec. 31, '96	3	3,185		h 64,925.03	116,564.23	g 41,800.24	540	g 190,714.78	g 11,468.26	133,172.48	2,232	114,925.17	1	
From Dec. 31, '96, to Dec. 31, '97	2	490		23,305.72	27,885.79	37,105.41	430	170,796.35	i 19,918.43	106,448.35	2,249	104,052.58	1	
Less relaid and mains abandoned.	247	710		\$2,016,507.81	\$1,268,635.57	\$433,346.06	15,212			\$1,043,389.14				
Net amount mains.....	7	4,684								*2,688.04				
	239	1,306								\$1,040,701.10				

a This includes relaying 16-inch pipe on Lafayette avenue near Trout Brook, of regrading street, at an expense of \$4,677.97.

b Pumping station established for high service in fall of 1884.

c Pumping stations established for well plant at Vadnaia lake, also Rice lakes.

d Pumping station established for high service in West St. Paul in fall of 1892.

e This includes laying the 20-inch force main to reservoir.

f This includes laying 9,234 feet of 30-inch supply main on Dale street from reservoir to Dale and Front, at an expense of \$38,365.78.

g This is for a period of 13 months.

h This includes laying 7,680 feet of 30-inch cast iron force main from McCarron lake pumping station to high service reservoir, at an expense of \$49,347.64.

i Decrease.

\* Amount refunded.

TABLE NO. 20.

STATEMENT SHOWING NUMBER OF METERS, CONSUMPTION OF WATER, AMOUNTS RECEIVED FOR WATER AND METER RENT, AND AVERAGE RATE PER MONTH.

Month. 1896.	Num- ber of Meters.	Consump- tion Cubic Feet.	Amounts Received for Water.	Amounts Receiv'd for Meter Rent.	Av. Rate per 100 Cub. F't.	Month. 1897.	Num- ber of Meters.	Consump- tion Cubic Feet.	Amounts Received for Water.	Amounts Receiv'd for Meter Rent.	Av. Rate per 100 Cub. F't.
January .....	1,155	5,970,603	\$4,824.93	\$224.00	.08081	January .....	1,594	6,249,691	\$5,103.00	\$299.19	.081
February .....	1,164	6,238,732	5,022.64	235.60	.08083	February .....	1,601	5,836,416	4,821.99	298.73	.0826
March .....	1,224	6,187,889	5,000.19	245.42	.08096	March .....	1,719	6,123,406	5,011.21	315.12	.0818
April .....	1,241	6,453,270	5,212.08	249.48	.08076	April .....	1,758	6,095,240	5,072.35	322.14	.0832
May .....	1,285	6,274,503	5,164.62	255.48	.08231	May .....	1,821	5,947,842	4,274.06	332.49	.0718
June .....	1,309	6,809,003	5,587.64	258.61	.0826	June .....	1,897	6,238,849	4,404.09	339.41	.0708
July .....	1,378	6,523,006	5,287.94	274.81	.08258	July .....	2,090	6,320,138	4,569.55	360.46	.0721
August .....	1,415	6,801,623	5,596.42	274.80	.08228	August .....	2,059	6,671,269	4,738.88	366.37	.071
September .....	1,489	7,892,095	6,305.34	289.77	.07989	September .....	2,183	6,616,801	4,840.61	389.06	.07315
October .....	1,515	6,518,949	5,324.12	292.80	.08167	October .....	2,262	6,542,878	4,764.48	389.73	.0728
November .....	1,596	6,541,652	5,309.11	290.25	.0811	November .....	2,286	6,394,309	4,620.55	399.97	.07226
December .....	1,546	5,935,142	4,886.44	291.05	.08233	December .....	2,298	6,295,372	4,574.95	402.38	.0726
Totals .....		78,147,427	\$63,621.47	\$3,192.07	.08141	Totals .....		75,392,211	\$56,855.72	\$4,225.05	.0754

## LIST OF VOUCHERS PAID FROM JAN. 1, 1897, TO DEC. 31, 1897.

JANUARY, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8480	C. L. Horst, city treasurer.....	Pay roll for December, 1896....	\$3,701.42
8481	C. L. Horst, city treasurer.....	Interest on water department bonds to Jan. 1, 1897.....	5,850.00
8482	C. L. Horst, city treasurer.....	Interest due Feb. 1, 1897.....	3,750.00
8483	Boeringer & Son.....	Repairing eng. instruments....	2.15
8484	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8485	P. N. Lindquist.....	Horseshoeing .....	3.50
8486	Jos. Peltier.....	One cord oak wood.....	2.50
8487	Cornplanter Oil Co.....	Gasoline .....	5.65
8488	Wyckoff, Seamans & Benedict....	Typewriter supplies .....	4.10
8489	Hennessy & Cox.....	Fire brick, cement and labor..	16.50
8490	Crane, Ordway & Co.....	Pipe and pipe fittings.....	24.93
8491	P. H. Kelly Merc. Co.....	Oil, candles and matches.....	40.04
8492	Farwell, Ozmun, Kirk & Co.....	Tools .....	12.90
8493	Smith & Farwell Co.....	Shade for second floor office....	.75
8494	The N. W. Telephone Ex. Co.....	Rent of telephones.....	7.25
8495	Northwestern Eng. Co.....	Spec. hot blast torch.....	4.50
8496	Robinson & Cary Co.....	Pipe fittings .....	2.06
8497	Daniel Cashill & Co.....	Horse shoeing .....	6.00
8498	Wedelstaedt & Carmen.....	Job printing .....	5.50
8499	Union Brass & Metal Mnfg. Co....	Rep. air chamber to lubricator..	2.25
8500	Allen & Co.....	Livery .....	5.00
8501	Joseph Garceau .....	Blacksmithing .....	3.75
8502	J. B. Trudeau.....	Hauling coal to Centerville....	33.10
8503	Northwestern Fuel Co.....	Est. No. 3, fuel.....	251.36
8504	Pioneer Fuel Co.....	Est. No. 2, fuel.....	75.00
8505	Fred Schroeder .....	Livery .....	2.00
8506	St. Paul Co-operative Painting Co.	Papering and kalsomining ....	2.75
8507	H. C. Boyeson.....	Stationery .....	15.00
8508	So. Park Foundry & Mach. Co....	One 24-inch plug .....	6.05
8509	The Western Supply Co.....	Pipe and pipe fittings.....	9.67
8510	Mitsch Wagon & Carriage Co....	Sharpening tools .....	7.44
8511	J. G. Duggan.....	Blacksmithing .....	10.05
8512	Jno. Caulfield, secretary.....	Cash advanced .....	55.80
8513	H. G. Neal.....	Replacing awning .....	1.50
8514	Nicols & Dean.....	Machine bolts .....	.38
8515	Jos. Forcier .....	Board of men—intake pipe....	8.85
8516	Ant. Lamotte.....	Poles for intake .....	21.84
8517	Thos. Brennan Lumber Co.....	Lumber for intake.....	73.59
8518	D. Cardinal .....	Hay .....	24.84
8519	The Globe Co.....	Advertising—proposals for oil..	4.42
8520	Jno. Townsend .....	Fire insurance .....	11.25
8521	Geo. H. Townsend.....	Insurance .....	11.25
8522	Jno. Rogers, Jr., & Bro.....	Insurance .....	13.10
8523	South Park Foundry & Mach. Co.	Est. No. 8, valves.....	52.50
8524	N. Feyen .....	Hauling piling—Hugo to Centerville .....	19.88
8525	Pioneer Press .....	Blank books .....	55.25
8526	Wedelstaedt & Carmen.....	Printing postal cards, etc.....	3.00
8527	John Kenny.....	Est. No. 1, smoke stack, Centerville .....	245.00
	Total .....		\$14,490.62



## LIST OF VOUCHERS—Continued.

FEBRUARY, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8528	C. L. Horst, city treasurer.....	Pay roll for January, 1897.....	\$3,333.22
8529	C. L. Horst, city treasurer.....	Interest due March 1, 1897.....	6,750.00
8530	Prendergast Bros.....	Gvanized iron and tin work....	2.57
8531	Meyers & Co.....	Repairing clock .....	1.00
8532	J. G. Duggan.....	Sharpening tools .....	2.90
8533	D. Cashill.....	Horseshoeing .....	5.00
8534	St. Paul Furniture Co.....	Repairing office desk .....	2.00
8535	Volkszeitung.....	Advertising .....	.80
8536	F. A. Leyde.....	Rent of portable engine—intake pipe .....	71.40
8537	M. Mealey .....	Canvas to cover boilers.....	3.00
8538	St. Paul Foundry Co.....	Stove for eng. house—Vadnais.	16.00
8539	Joseph Cartier .....	Rent of engine—intake pipe....	5.60
8540	Swedburg & Lindquist.....	Iron for pump—intake pipe....	1.25
8541	Mahle & Sutmar.....	Tools and blacksmithing.....	12.10
8542	S. C. Smith.....	Livery to Centerville .....	5.00
8543	Boeringer & Son.....	Tracing cloth, ink, etc.....	6.75
8544	Pioneer Press Co.....	Adv. bids for printing annual report .....	3.66
8545	Wyckoff, Seamans & Benedict....	Typewriter supplies .....	19.36
8546	C. Friend & Son.....	Leather for meters and harness fittings .....	4.35
8547	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8548	Cornplanter Oil Co.....	Gasoline .....	.60
8549	The Western Supply Co.....	Pig tin, water gauge, etc.....	9.56
8550	H. E. Wedelstaedt & Co.....	Stationery, etc.....	9.18
8551	H. C. Boyeson Sta. Co.....	Stationery .....	14.40
8552	Brown, Treacy & Co.....	Blank books, etc.....	27.85
8553	Robinson & Cary Co.....	Pipe covering, etc.....	58.53
8554	Crane & Ordway Co.....	Boiler feed pump, etc., Center- ville .....	95.96
8555	Canceled by city comptroller.....	.....	.....
8556	Joel T. Million.....	Est. No. 3, pipe laying, Duke street .....	114.92
8557	National Meter Co.....	Est. No. 11, meters.....	645.00
8558	Farwell, Ozmun, Kirk & Co.....	Nails and tools.....	7.60
8559	Canceled by city comptroller.....	.....	.....
8560	Tierney & Co.....	Feed .....	.58
8561	Foley Bros. & Kelly Merc. Co....	Oil .....	13.36
8562	Joseph Garceau.....	Blacksmithing .....	3.75
8563	Ed. Gregoisse .....	Blacksmithing .....	5.90
8564	Joseph N. Forcier.....	Board, livery, etc., surveyors..	68.70
8565	John Caulfield, secretary.....	Cash advanced .....	68.28
8566	Pioneer Fuel Co.....	Est. No. 3, fuel.....	75.00
8567	N. W. Fuel Co.....	Est. No. 4, fuel.....	948.04
8568	Neptune Meter Co.....	Meters .....	202.85
8569	Ransome Subway Co.....	Lumber .....	7.66
8570	C. L. Horst, city treasurer.....	For investment in water de- partment sinking fund.....	10,000.00
8571	S. Swanson .....	Est. No. 1 and final, wells, Vadnais lake .....	1,095.20
8572	Andrew Falk, for H. J. & A. E. Horn .....	Settlement for damages.....	300.00
	Total .....	.....	\$24,043.18



## LIST OF VOUCHERS—Continued.

MARCH, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8573	C. L. Horst, city treasurer.....	Pay roll for February.....	\$3,227.09
8574	C. L. Horst, city treasurer.....	Interest due April 1, 1897.....	25,000.00
8575	D. L. Bell.....	Cement and cement bags.....	8.05
8576	Jno. Martin Lumber Co.....	Lumber.....	8.00
8577	Union Water Meter Co.....	Meter fixtures.....	14.25
8578	Thomson Meter Co.....	Meter fittings.....	12.30
8579	D. Cardinal.....	Oats.....	15.76
8580	Dispatch Printing Co.....	Advertising.....	3.00
8581	The Washburn Building.....	Electric lighting—Office.....	30.00
8582	Goodyear Rubber Co.....	Hose, etc.....	85.51
8583	South Pk. Foun. & Mach. Co.....	Repacking hydrant valves, etc.....	31.20
8584	Frank Hart, clerk of court, Anoka, Minn.....	Transcripts, Belland et al. vs. Water Board.....	67.50
8585	H. W. Phillips, Asst. Corp. Atty..	Deposit clerk of court Hennepin Co., water board.....	55.00
8586	Jos. Trudeau.....	Tools.....	1.30
8587	A. Lamotte.....	Tamarack timber for intake pipe.....	20.00
8588	Joseph Carkey.....	Rent of portable engine, intake cylinder oil.....	6.80
8589	Dearborn Drug & Chemical Wks.	Engine and cylinder oil.....	22.50
8590	V. R. Benham.....	Lumber.....	6.05
8591	Thos. Brennam Lumber Co.....	Sharpening tools.....	43.66
8592	J. G. Duggan.....	Stationery.....	4.60
8593	H. C. Boyeson Sta. Co.....	Letter book, etc.....	6.70
8594	Wyckoff, Seamans & Benedict.....	Stationery.....	4.65
8595	Brown, Treacy & Co.....	Oil, candles, etc.....	10.00
8596	Foley Bros. & Kelly Merc. Co.....	Tools.....	8.86
8597	Farwell, Ozmun, Kirk & Co.....	Engine fittings.....	6.69
8598	The Crane & Ordway Co.....	Rent of storage lot.....	2.58
8599	Estate of Jas. Gilfillan.....	Vacuum Gauges.....	25.00
8600	Robinson & Cary Co.....	Asphalt paint, etc.....	30.10
8601	T. L. Blood & Co.....	Stationery.....	3.05
8602	H. E. Wedelstaedt & Co.....	Insurance on wood.....	8.10
8603	Jno. Rogers, Jr., & Bro.....	Meals for officers to Centerville.....	12.00
8604	C. Neumann.....	Cloth for asbestos covering boilers, etc.....	20.00
8605	M. Mealey.....	Est. No. 5, fuel.....	1.08
8606	N. W. Fuel Co.....	Supplies.....	91.63
8607	Geo. J. Mitsch & Co.....	Job printing.....	7.45
8608	H. M. Smyth Printing Co.....	Rubber diaphragm for pump.....	7.25
8609	American Hoist & Derrick Co.....	Repairing cutter.....	4.00
8610	Mitsch Wagon & Carriage Co.....	Horse shoeing.....	3.25
8611	P. N. Lindquist.....	Repairing engineer's rods, etc.....	1.50
8612	Boeringer & Son.....	Cement.....	6.50
8613	D. L. Bell.....	Lumber.....	2.80
8614	Jno. Martin Lumber Co.....	Repainting and repairing buggies, etc.....	8.00
8615	J. H. Schurmeier Wag. & Car. Co.	Job printing.....	59.75
8616	Wedelstaedt & Carmen.....	Horseshoeing.....	5.75
8617	Dan Cashill & Co.....	Gasoline.....	3.00
8618	Cornplanter Oil Co.....	Screen frames.....	.60
8619	A. & W. McGuiggan.....	Wood for Centerville station..	6.50
8620	Nels Proulx.....	Wood for Centerville station..	50.00
8621	Leon F. Dupre.....	Wood for Centerville station..	50.00
8622	Aug. Thon.....	Wood for Centerville station..	38.75
8623	Henry Dupre.....	Wood for Centerville station..	37.50
8624	A. Totte.....	Wood for Centerville station..	30.00
8625	Mich. Gallagher.....	Wood for Centerville station..	28.75
8626	Severe R. Dufresne.....	Wood for Centerville station..	62.50
8627	Jno. E. Barrott.....	Wood for Centerville station..	62.50
8628	Jos. Proulx, Sr.....	Wood for Centerville station..	34.00
8629	Phillip F. Lamotte.....	Wood for Centerville station..	62.50
8630	Joseph Krinsner, Jr.....	Wood for Centerville station..	37.50
8631	Andrew Anderson.....	Wood for Centerville station..	30.00

## LIST OF VOUCHERS.—Continued.

MARCH 1897—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8632	Jos. Trudeau .....	Wood for Centerville station..	55.00
8633	Jno. Boehm .....	Wood for Centerville station..	30.00
8634	Alfred Gagner .....	Wood for Centerville station..	32.00
8635	Napoleon Savigney .....	Wood for Centerville station..	41.00
8636	Michael Zeibel .....	Wood for Centerville station..	37.50
8637	John B. Proulx .....	Wood for Centerville station..	30.00
8638	Leon Dupre .....	Wood for Centerville station..	58.00
8639	Joseph Garceau .....	Blacksmithing .....	2.50
8640	Joseph Carpenter .....	Nails .....	2.50
8641	F. A. Leyde .....	Rent of portable engine.....	46.50
8642	C. Cardinal .....	Rubble rock .....	28.00
8643	Joseph N. Forcier.....	Board and teaming.....	26.80
8644	Geo. C. Garrow, agent.....	Tires for vault book case.....	2.00
8645	Jno. Caulfield, secretary.....	Cash advanced .....	50.48
8646	W. H. Ulmer .....	Stone flagging .....	5.50
8647	Ransome Subway Co.....	Est. No. 6, Otter Lake conduit.	413.29
8648	C. L. Horst, city treasurer.....	Investment in sinking fund....	15,000.00
8649	N. W. Telephone Ex. Co.....	Repairing country line .....	4.50
8650	Neptune Meter Co.....	Meters .....	210.00
8651	National Meter Co.....	Meters .....	475.00
8652	Lyle M. Fisher.....	Est. No. 1 and final, printing annual report .....	335.80
Total .....			\$46,419.73

## LIST OF VOUCHERS—Continued.

APRIL, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8653	C. L. Horst, city treasurer.....	Pay roll for March.....	\$3,012.17
8654	Union Brass & Metal Mnfg. Co..	Float and valve, etc.....	3.85
8655	Joseph F. Lamotte.....	Hauling coal from Hugo stati'n	24.40
8656	Foley Bros. & Kelly Merc. Co....	Oil and candles.....	21.91
8657	T. L. Blood & Co.....	Oil and red lead.....	1.59
8658	Dan Cashill & Co.....	Horseshoeing.....	6.00
8659	Brown, Treacy & Co.....	Stationery.....	32.56
8660	Volkszeitung Publishing Co.....	Advertising.....	2.50
8661	Pioneer Press Co.....	Blank books and advertising..	15.22
8662	Jos. N. Forcier.....	Board and teaming.....	14.00
8663	J. G. Duggan.....	Sharpening tools.....	8.25
8664	Cornplanter Oil Co.....	Gasoline.....	1.20
8665	Dispatch Printing Co.....	Advertising.....	7.50
8666	Wyckoff, Seamans & Benedict...	Ribbon for typewriter.....	1.00
8667	Robinson & Cary Co.....	Wire cloth, packing, tools, etc.	33.08
8668	The Crane & Ordway Co.....	Pipe and pipe fittings.....	28.97
8669	H. E. Wedelstaedt.....	Stationery.....	2.90
8670	H. C. Boyeson Stationery Co.....	Stationery.....	1.50
8671	N. W. Fuel Co.....	Estimate No. 6, fuel.....	236.59
8672	Pioneer Fuel Co.....	Estimate No. 4, coal.....	37.50
8673	Boeringer & Son.....	Drawing ink.....	.50
8674	Dennis Bernier.....	Wood.....	56.12
8675	Jno. F. Hall.....	Wood.....	36.25
8676	Joseph Arth.....	Wood.....	50.62
8677	Napoleon Morrisette.....	Wood.....	50.00
8678	Charlotte Rogers.....	Wood.....	59.75
8679	Bert Hughes.....	Wood.....	37.50
8680	Sam'l L. Neal.....	Wood.....	23.12
8681	Jos. N. Forcier.....	Wood.....	63.75
8682	Walter P. Jones.....	Wood.....	2.50
8683	Ambrose Brisette.....	Wood.....	7.81
8684	John Leibel.....	Wood.....	5.00
8685	J. H. Schurmier Wagon & Car. Co	Oil carpet for buggy.....	1.00
8686	Kenny Bros.....	Repairing boiler.....	5.50
8687	Farwell, Ozmun, Kirk & Co.....	Nails, etc.....	37.09
8688	The Globe Co.....	Advertising.....	3.00
8689	Mitsch Wagon & Carriage Co....	Painting and repairing buggies	32.55
8690	Jno. Martin Lumber Co.....	Lumber.....	20.17
8691	Estate of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8692	Frank Skok.....	Steel pointing picks.....	5.40
8693	N. W. Copper & Brass Works....	Repairing water gauge.....	.50
8694	O. J. Piette.....	Weighing coal.....	1.90
8695	John A. Lavallee.....	Board of Shouse.....	3.50
8696	The Crane & Ordway Co.....	Estimate No. 1 and final, lead pipe and block tin.....	1,573.61
8697	John Caulfield, secretary.....	Cash advanced.....	94.02
8698	C. L. Horst, city treasurer.....	Interest due May 1, 1897.....	8,750.00
8699	The E. P. Allis Co.....	Suction pipe, 36-inch.....	63.45
8700	Union Brass & Metal Mnfg. Co..	Valves.....	3.60
8701	The E. P. Allis Co.....	Estimate No. 2, pump engine..	5,000.00
	Total.....		\$19,505.90

## LIST OF VOUCHERS—Continued.

MAY, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8702	C. L. Horst, city treasurer.....	Pay roll for April 1897.....	\$3,199.36
8703	Gribben Lumber Co.....	Lumber .....	80.00
8704	Thos. Brennan Lumber Co.....	Lumber .....	17.44
8705	H. G. Neal.....	Covers for buggies.....	5.00
8706	J. H. Sherman.....	Hay .....	37.50
8707	Lovene & Anderson.....	Refund on account connection.....	2.65
8708	F. Isaac.....	Refund on account connection.....	4.30
8709	Otto Schaller.....	Refund on account connection.....	.50
8710	The London & N. W. Am. Mtg. Co.....	Refund on account connection.....	1.95
8711	Mrs. C. Carlson.....	Refund on account connection.....	1.65
8712	M. E. Wallish.....	Refund on account connection.....	1.65
8713	Wm. F. Colton.....	Refund on account connection.....	4.30
8714	T. J. Kelly.....	Refund on account connection.....	1.30
8715	Wm. Schornstein.....	Refund on account connection.....	4.30
8716	Franklin Hofer .....	Refund on account connection.....	.50
8717	Standard Oil Co.....	Oil .....	3.00
8718	N. W. Electric Co.....	Connecting new commutator..	8.00
8719	Robinson & Cary Co.....	Pump and couplings.....	59.61
8720	Farwell, Ozmun, Kirk & Co.....	Powder and tools.....	7.50
8721	D. L. Bell.....	Lime and cement.....	6.25
8722	The Western Supply Co.....	Plumbers' furnace, valves, etc.	4.20
8723	H. E. Wedelstaedt & Co.....	Stationery and printing.....	6.50
8724	Brown, Treacy & Co.....	Printing and stationery.....	20.25
8725	Wyckoff, Seamans & Benedict....	Typewriter supplies.....	3.15
8726	H. C. Boyeson Stationery Co.....	Stationery .....	1.05
8727	St. Paul Rubber Co.....	Rubber boots .....	10.70
8728	Chas. Friend & Son.....	Leather .....	2.25
8729	De Coster & Clark.....	Table for stenographer.....	3.75
8730	Cornplanter Oil Co.....	Gasoline .....	1.20
8731	South Park Foundry & Mach. Co....	Valves and special castings....	46.43
8732	Nicols & Dean.....	Machine bolts and washers....	20.97
8733	N. W. Fuel Co.....	Estimate No. 7, fuel.....	83.61
8734	Wedelstaedt & Carmen.....	Job printing.....	11.25
8735	Pioneer Fuel Co.....	Estimate No. 5, fuel.....	15.00
8736	A. Decker & Co.....	Hardware .....	.25
8737	Pioneer Press Co.....	Job printing, blank books and advertising .....	86.83
8738	Geo. J. Mitsch & Co.....	Supplies for barn, etc.....	5.85
8739	Jos. N. Forcier.....	Teaming and board.....	8.70
8740	Viscosity Oil Co.....	Cylinder oil .....	20.58
8741	Diebold Safe & Lock Co.....	Clamps for vault files.....	2.00
8742	The Crane & Ordway Co.....	Pipe and pipe fittings.....	67.19
8743	Thos. Brennan Lumber Co.....	Lumber .....	23.63
8744	J. G. Duggan.....	Sharpening tools, etc.....	3.95
8745	Mahle & Sutmar.....	New wagon, blacksmithing, etc	58.68
8746	Fire and water.....	Advertising for pump.....	24.00
8747	South Park Foundry & Mach. Co....	Gate valves.....	47.90
8748	John Caulfield, secretary.....	Cash advanced.....	60.14
8749	D. Cashill .....	Horseshoeing .....	6.00
8750	Estate of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8751	National Meter Co.....	Meter parts.....	44.85
8752	D. D. Smith, agent.....	Electric light .....	5.00
8753	Patrick Doherty.....	Estimate No. 6 and final, lay- ing water pipe.....	344.05
8754	Fairbanks, Morse & Co.....	Estimate No. 4 and final, lay- ing 36-inch pipe.....	651.11
8755	John Kenny .....	Estimate No. 2 and final, boil- ers McCarron lake.....	176.50
8756	E. W. Bazille.....	Abstracts of title.....	13.60
8757	Geo. J Mitsch & Co.....	Linseed meal .....	1.80
8758	D. D. Smith, agent.....	Electric light .....	5.00
8759	P. N. Lindquist.....	Horseshoeing .....	2.00
8760	D. F. De Wolf.....	Oats .....	41.63
8761	Boeringer & Son.....	Drawing material .....	2.40
8762	Jno. Martin Lumber Co.....	Lumber and tamarack poles...	18.67

## LIST OF VOUCHERS—Continued.

MAY, 1897—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8763	A. & W. McGuiggan.....	Moving storm sash.....	1.80
8764	Mitsch Wagon & Carriage Co....	Blacksmithing .....	8.55
8765	Bingham & Taylor.....	Estimate No. 1, valve boxes..	227.45
8766	Anthony P. Smith.....	Estimate No. 4, patent sleeves and valves .....	92.00
8767	Joseph Arth.....	Wood .....	21.71
8768	Aug. Rehbein .....	Wood .....	20.62
8769	Warren-Scharf Asphalt Pav. Co..	Repairing pavement .....	17.29
8770	The Engineering Record.....	One year's subscription .....	5.00
8771	Jos. A. Forcier.....	Board for surveyors .....	7.41
8772	Allen & Co.....	Livery .....	5.00
8773	National Meter Co.....	Meter fixtures .....	15.00
8774	The Dwyer Plumbing & Heat. Co.	Estimate No. 1, service boxes..	925.00
8775	Napoleon Savigney.....	Tamarack piling .....	45.50
8776	South Park Foundry & Mach. Co.	Valves and special castings....	58.00
8777	C. L. Horst, city treasurer.....	Interest on bonds due June 1, 1897 .....	7,000.00
Total .....			\$13,874.71



## LIST OF VOUCHERS—Continued.

JUNE, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8778	C. L. Horst, city treasurer.....	Pay roll for May, 1897.....	\$4,225.76
8779	Pioneer Press Co.....	Blank books and advertising...	30.56
8780	Wyckoff, Seamans & Benedict....	Typewriter supplies .....	10.74
8781	The Western Supply Co.....	Solder nipples .....	6.15
8782	St. Paul Foundry Co.....	Gates, box covers.....	10.69
8783	D. D. Smith, agent.....	Electric light .....	5.00
8784	Thos. Brennan Lumber Co.....	Lumber .....	93.20
8785	Board of Fire Commissioners.....	Condemned hose .....	100.00
8786	Jno. Martin Lumber Co.....	Lumber .....	34.60
8787	Gribben Lumber Co.....	Lumber .....	91.00
8788	And. Schoch Grocery Co.....	Kleansall .....	4.00
8789	Brown, Treacy & Co.....	Stationery .....	2.53
8790	The Crane & Ordway Co.....	Estimate No. 1, brass goods..	254.31
8791	The Crane & Ordway Co.....	Pipe fittings .....	12.81
8792	Farwell, Ozmun, Kirk & Co.....	Powder, fuse and tools.....	21.90
8793	Robinson & Cary Co.....	Tools .....	18.25
8794	Foley Bros. & Kelly Mer. Co.....	Oil, matches, etc.....	9.08
8795	A. Decker & Co.....	Barb wire and staples.....	2.65
8796	St. Paul Rubber Co.....	Rubber bumpers .....	.35
8797	T. L. Blood & Co.....	Paint .....	4.43
8798	Roberts-Goss Co.....	Tapping nuts .....	1.00
8799	Dan Cashill .....	Horseshoeing .....	6.00
8800	H. C. Boyeson Stationery Co.....	Stationery .....	1.30
8801	Chas. Friend & Son.....	Rubber blanket, etc.....	2.65
8802	St. Paul Stone Co.....	Cement tiling.....	4.80
8803	H. E. Wedelstaedt & Co.....	Stationery .....	10.08
8804	N. W. Fuel Co.....	Estimate No. 8, fuel.....	972.47
8805	Wedelstaedt & Carmen.....	Stationery .....	14.00
8806	Goodyear Rubber Co.....	Yerdon's clamps.....	5.32
8807	P. N. Lindquist.....	Horseshoeing .....	2.00
8808	Martin Feist .....	Lunch for men cleaning conduit	3.50
8809	H. M. Smyth Printing Co.....	Books .....	4.50
8810	Joseph Garceau.....	Blacksmithing .....	8.50
8811	J. Lavalley .....	Board of foreman.....	22.50
8812	J. N. Forcier.....	Board of men and stabling....	19.15
8813	Pittsburg Meter Co.....	Meters and connections.....	24.25
8814	S. C. Smith.....	Livery to Centerville.....	12.50
8815	Jno. Caulfield, secretary.....	Cash advanced .....	41.77
8816	Estate of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8817	Kenny Bros.....	Labor repairing boiler.....	9.00
8818	Nicols & Dean.....	Steel, etc.....	2.85
8819	J. G. Duggan.....	Blacksmithing .....	2.60
8820	C. L. Horst, city treasurer.....	Interest due July 2, 1897.....	5,850.00
8821	Allen & Co.....	Livery .....	10.00
8822	H. M. Smyth Printing Co.....	Connection reports .....	4.50
8823	Minnesota Engine Works.....	Machine work, Centerville....	5.02
8824	Mitsch Wagon & Carriage Co.....	Blacksmithing .....	3.23
8825	St. Paul Foundry Co.....	Casting, Centerville p'mp house	10.20
8826	N. W. Stamp Works.....	Stamps and wood cut.....	2.00
8827	D. L. Bell.....	Cement .....	2.80
8828	Michigan Brass & Iron Works....	Automatic drip valves.....	96.00
8829	The Engineering News Pub. Co....	Advertising pumps, etc.....	34.20
8830	Bingham & Taylor.....	Base for stop cock boxes.....	8.09
8831	Thomson Meter Co.....	Meter fixtures .....	5.15
8832	Neptune Meter Co.....	Meter fixtures .....	3.30
8833	Napoleon Savigney.....	Tamarack piling .....	8.64
8834	M. F. Brennan.....	Livery .....	6.50
8835	South Park Foundry & Mach. Co....	Pile driver hammer and tees...	27.38
8836	South Park Foundry & Mach. Co....	Estimate No. 1, valves.....	7.00
8837	H. W. Phillips.....	Expense, court fees, Hennepin county .....	19 05

## LIST OF VOUCHERS—Continued.

JUNE 1897—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8838	C. A. Fuller.....	Estimate No. 1 and final, pig lead.....	518.98
8839	The Crane & Ordway Co.....	Estimate No. 2, brass goods...	250.56
8840	Jno. Caulfield, secretary.....	Cash advanced .....	174.89
8841	J. W. Cunningham & Co.....	Job printing .....	14.75
8842	Foley Bros. & Kelly Mer. Co....	Candles .....	4.80
8843	Cornplanter Oil Co.....	Oil and gasoline.....	32.71
8844	T. L. Blood & Co.....	Paint .....	1.70
8845	P. H. Thornton.....	Estimate No. 1, laying mains..	321.75
8846	C. L. Horst, city treas.....	Sinking fund investment.....	50,000.00
	Total .....		\$63,556.95

## LIST OF VOUCHERS—Continued.

JULY, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8847	C. L. Horst, city treasurer.....	Pay roll for June.....	\$3,945.42
8848	C. L. Horst, city treasurer.....	Interest due Aug. 1, 1897.....	3,750.00
8849	O. J. Piette.....	Hay .....	23.52
8850	Jno. Fitzgerald, superintendent..	Brooms .....	2.00
8851	Henry Orme .....	Estimate No. 1, special cast- ings .....	135.00
8852	Wedelstaedt & Carmen.....	Receipt blanks, etc.....	4.75
8853	Arnold Uhler .....	Malls and handles.....	3.00
8854	St. Paul Gaslight Co.....	Lamp shade.....	2.50
8855	Jos. A. Forcier.....	Board and livery.....	29.10
8856	Pioneer Press Co.....	Advertising for fuel.....	3.91
8857	Geo. J. Mitsch & Co.....	Supplies .....	1.90
8858	Jos. F. Lamotte.....	Estimate No. 1, fencing.....	451.00
8859	Jos. F. Lamotte.....	Estimate No. 2 and final, fenc- ing .....	252.71
8860	N. W. Fuel Co.....	Estimate No. 9, fuel 1896.....	99.70
8861	N. W. Fuel Co.....	Estimate No. 1, fuel 1897.....	61.92
8862	H. C. Boyeson Stationery Co.....	Stationery .....	5.65
8863	Thos. Brennan Lumber Co.....	Lumber .....	71.83
8864	H. E. Wedelstaedt & Co.....	Envelopes .....	6.40
8865	Smith & Farwell Co.....	Office stool .....	2.25
8866	Mitsch Wagon & Carriage Co.....	Sharpening tools.....	2.89
8867	P. N. Lindquist.....	Horseshoeing .....	2.50
8868	Dan Cashill & Co.....	Horseshoeing .....	6.00
8869	Fielding & Shepley.....	Relaying pavement.....	4.43
8870	John Martin Lumber Co.....	Lumber .....	58.79
8871	Robt. W. Hunt & Co.....	Inspecting pipe at foundry.....	51.50
8872	Brown, Treacy & Co.....	Stationery .....	1.58
8873	Cornplanter Oil Co.....	Gasoline .....	1.20
8874	Chas. Friend & Son.....	Leather washers .....	.20
8875	A. Decker & Co.....	Hardware .....	5.37
8876	Foley Bros. & Kelly Mer. Co.....	Oil and candles.....	26.50
8877	Robinson & Cary Co.....	Wire rope and tools.....	15.40
8878	Estate of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8879	The Crane & Ordway Co.....	Estimate No. 3, brass goods....	24.73
8880	The Crane & Ordway Co.....	Galvanized iron pipe, etc.....	32.03
8881	Farwell, Ozmun, Kirk & Co.....	Powder, tools, etc.....	20.13
8882	Mahle & Sutmar.....	Seat and cushion hydrant wagon .....	4.00
8883	J. H. Shurmeier Wagon & C. Co..	Buggy spring and repairs.....	4.25
8884	N. W. Stamp Works.....	Stamp .....	.50
8885	J. G. Duggan.....	Sharpening tools, etc.....	2.65
8886	D. L. Bell.....	Cement .....	56.35
8887	Boeringer & Son.....	One gauge-level.....	1.25
8888	Minnesota Engine Works.....	Sharpening lawn mowers.....	2.50
8889	St. Paul Sash, Door & Lumber Co.	Hydrant boxes.....	7.20
8890	South Pittsburg Pipe Works.....	Estimate No. 1, cast iron pipe..	2,892.47
8891	Tierney & Co.....	Feed .....	1.73
8892	Michigan Brass & Iron Works....	Brass drip valves.....	78.00
8893	P. H. Thornton.....	Estimate No. 2 and final, pipe laying .....	58.65
8894	Fairbanks, Morse & Co.....	Estimate No. 1, pipe laying....	585.90
	Total .....		\$12,826.26

## LIST OF VOUCHERS—Continued.

AUGUST, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8895	C. L. Horst, city treasurer.....	Interest due Sept. 1, 1897.....	6,750.00
8896	Brown, Treacy & Co.....	Steel case for vault.....	160.00
8897	Frank Skok.....	Blacksmithing .....	4.50
8898	Griggs Bros.....	Oats .....	43.67
8899	South Park Foundry & Mach. Co.	Estimate No. 2, valves.....	235.00
8900	McGill-Warner Co.....	Permit books .....	8.50
8901	Wyckoff, Seamans & Benedict....	Oil and carbon.....	3.00
8902	St. Paul Furniture Co.....	Repairing desk.....	10.25
8903	Fairbanks, Morse & Co.....	Water pipe, etc.....	28.50
8904	Thos. Brennan Lumber Co.....	Lumber .....	28.13
8905	Jno. A. Lavalley.....	Board .....	15.00
8906	Michigan Cedar Co.....	Cedar posts .....	4.60
8907	Grenier & Corning.....	Sewer brick.....	96.00
8908	A. P. Smith.....	Estimate No. 6, patent sleeves.	200.00
8909	Jno. Caulfield, secretary.....	Cash advanced .....	96.80
8910	C. Matheis.....	Repairing window shades.....	5.20
8911	Henry Orme.....	Estimate No. 2, specials, etc..	100.52
8912	Jefferson & Kasson.....	Lumber .....	192.05
8913	St. Paul Foundry Co.....	Railroad iron .....	13.75
8914	Pioneer Press Co.....	Printing postals .....	18.00
8915	H. M. Smyth Printing Co.....	Mounting maps .....	2.50
8916	C. L. Horst, city treas.....	Pay roll for July .....	4,032.94
8917	N. W. Fuel Co.....	Estimate No. 10, fuel 1896....	994.37
8918	South Park Foundry & Mach. Co.	Estimate No. 3, valves.....	85.60
8919	Pioneer Press Co.....	Job printing.....	36.50
8920	J. G. Duggan.....	Blacksmithing .....	6.25
8921	Jno. A. Lavalley.....	Board of foreman.....	12.90
8922	S. C. Smith.....	Livery to Centerville.....	8.00
8923	Estate of Jas. Gilfillan.....	Rent of storage lot.....	25.00
8924	Wedelstaedt & Carmen.....	Job printing .....	17.00
8925	D. L. Bell.....	Cement .....	273.55
8926	Thos. Brennan Lumber Co.....	Lumber .....	40.66
8927	Franklin Mach. Works.....	Repairing tapping machine....	.75
8928	The Western Supply Co.....	Valves, pipe, etc.....	22.29
8929	Volkszeitung Printing Co.....	Advertising .....	.50
8930	D. D. Smith, agent.....	Electric light .....	10.00
8931	Dan Cashill & Co.....	Horseshoeing .....	6.00
8932	Fielding & Shepley.....	Relaying pavement .....	26.91
8933	H. C. Boyeson Stationery Co.....	Tags .....	.40
8934	H. E. Wedelstaedt & Co.....	Stationery, etc.....	4.55
8935	The Dispatch Printing Co.....	Advertising .....	2.00
8936	The Globe Co.....	Advertising .....	1.50
8937	Brown, Treacy & Co.....	Stationery .....	6.91
8938	Union Brass & Metal Mfg. Co..	Brass goods .....	20.85
8939	P. N. Lindquist.....	Horseshoeing .....	4.00
8940	T. L. Blood & Co.....	Paint and oil.....	3.13
8941	Mitsch Wagon & Carriage Co....	Sharpening tools .....	1.75
8942	Robinson & Cary Co.....	Rope, emery cloth, etc.....	2.50
8943	Nicols & Dean.....	Machine bolts and washers....	1.99
8944	Noyes Bros. & Cutler.....	Mercury gauge rod, etc.....	1.34
8945	A. Decker & Co.....	Tools .....	.45
8946	Ogden, Merrill & Greer.....	Tumblers .....	.45
8947	Allen & Co.....	Livery .....	4.00
8948	Foley Bros. & Kelly Mer. Co.....	Oil, etc .....	5.70
8949	Cornplanter Oil Co.....	Gasoline .....	1.20
8950	St. Paul Rubber Co.....	Hip boots .....	3.21
8951	Geo. J. Mitsch & Co.....	Supplies .....	12.65
8952	Minnesota Engine Works.....	Machine work .....	4.37
8953	J. H. Schurmeier Wagon & C. Co.	Repairing buggy .....	2.00
8954	Wm. H. Ulmer.....	Granite coping for Vadnais lake	199.00
8955	The Crane & Ordway Co.....	Packing, pipe and fittings....	83.58
8956	Farwell, Ozmun, Kirk & Co.....	Tools .....	14.16
8957	N. W. Stamp Works.....	Steel branding stamp.....	1.50

## LIST OF VOUCHERS—Continued.

AUGUST, 1897—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
8958	Jno. Martin Lumber Co.....	Lumber .....	33.48
8959	Peter Johnson.....	Gravel for Vadnais weir.....	106.06
8960	Chas. Friend & Son.....	Set of harness and repairs....	33.15
8961	Jos. M. Forcier.....	Board of men.....	16.09
8962	St. Paul Foundry Co.....	Special castings .....	36.30
8963	Hennessy & Cox.....	Relaying asphalt paving.....	52.98
8964	Fairbanks, Morse & Co.....	Estimate No. 1, laying water mains .....	937.98
8965	Frank Wauchura.....	Refund on rock connection....	13.00
8966	Jno. Caulfield, secretary.....	Cash advanced.....	41.06
8967	Barrett & Zimmermann.....	Horse .....	75.00
8968	Pittsburg Meter Co.....	Estimate No. 1, meters.....	2,738.00
	Total .....	.....	\$18,080.88



## LIST OF VOUCHERS—Continued.

SEPTEMBER, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
8969	Thos. Rashak.....	Blasting timbers .....	8.75
8970	South Park Foundry & Mach. Co.	Estimate No. 1, sprinkler attachment .....	288.00
8971	T. Vandlae.....	Estimate No. 14, hauling coal Vадnais lake .....	27.85
8972	Olzenski & Romans.....	Meals testing pumps, Centerville .....	53.50
8973	St. Paul Furniture Co.....	Repairing office stool.....	1.00
8974	St. Paul Lime & Cement Co.....	Sewer brick .....	9.12
8975	N. W. Telephone Exchange Co..	Rent telephones, private line...	25.00
8976	N. W. Shot & Lead Works.....	Lead pipe .....	19.35
8977	John Kenny.....	Weir plate for Vадnais lake...	45.75
8978	National Meter Co.....	Meter fittings .....	6.00
8979	Pittsburg Meter Co.....	Meters .....	568.00
8980	The E. F. Allis Co.....	Estimate No. 3, pump, Centerville .....	5,000.00
8981	F. W. Luley & Son.....	Tallow .....	1.60
8982	Thos. Brennan Lumber Co.....	Lumber Vадnais Lake engine house .....	41.60
8983	South Park Foundry & Mach. Co.	Estimate No. 1, fire hydrants..	130.00
8984	South Park Foundry & Mach. Co.	Estimate No. 4, valves.....	125.75
8985	South Pittsburg Pipe Works.....	Estimate No. 2, pipe.....	3,404.83
8986	H. A. Muckle Mnfg. Co.....	Buggy .....	76.00
8987	Scribner-Libby Co.....	Repairing roof, etc.....	35.56
8988	James Shiely .....	Hauling brick, Cardigan Junction .....	9.75
8989	James Shiely .....	Estimate No. 1, drayage.....	172.56
8990	C. L. Horst, city treasurer.....	Pay roll for August.....	4,056.31
8991	C. L. Horst, city treasurer.....	Interest due Oct. 1, 1897.....	25,000.00
8992	South Pittsburg Pipe Works.....	Est. No. 3, pipe.....	856.81
8993	Fire and Water.....	Subscription to April 25, 1898..	3.00
8994	Pioneer Press Co.....	Job printing .....	35.37
8995	P. N. Lindquist.....	Horse shoeing .....	5.50
8996	Adam Decker & Co.....	Hardware .....	15.59
8997	Reichow Bros.....	Omnibus and four horses to Centerville .....	8.00
8998	Washburn building .....	Electric light .....	5.00
8999	Minnesota Engine Works.....	Machine work .....	3.50
9000	St. Paul Lime & Cement Co.....	Sewer pipe .....	18.00
9001	Thos. Brennan Lumber Co.....	Lumber .....	5.83
9002	J. G. Duggan.....	Blacksmithing .....	6.10
9203	Dan Cashill.....	Horse shoeing .....	2.00
9004	Wedelstaedt & Carmen.....	Job printing .....	6.50
9005	Estate of Jas. Gilfillan.....	Rent of storage lot.....	25.00
9006	Allen & Co.....	Livery .....	7.00
9007	Boeringer & Son.....	Drawing material .....	4.25
9008	Tierney & Co.....	Feed .....	.98
9009	Jos. N. Forcier.....	Board and stabling.....	30.44
9010	South Park Foundry & Mach. Co.	Est. No. 2, sluice gate.....	175.00
9011	South Park Foundry & Mach. Co.	Est. No. 2, fire hydrants .....	472.50
9012	H. C. Boyeson Sta. Co.....	Stationery .....	2.75
9013	The Western Supply Co.....	Pipe fittings .....	1.78
9014	Cornplanter Oil Co.....	Gasoline, etc.....	7.08
9015	Franklin Machine Works.....	Sharpening drill .....	.75
9016	Nicols & Dean.....	Iron and bolts .....	5.32
9017	Foley Bros. & Kelly Merc. Co....	Tea lead, etc.....	27.76
9018	Farwell, Ozmun, Kirk & Co.....	Powder, nails, etc.....	5.95
9019	Ogden, Merrill & Greer.....	Lantern fixtures .....	.51
9020	Brown, Treacy & Co.....	Stationery .....	3.33
9021	Wyckoff, Seamans & Benedict...	Typewriter supplies .....	1.50
9022	H. E. Wedelstaedt & Co.....	Stationery .....	18.66
9023	Smith & Farwell Co.....	Office chairs .....	8.80
9024	N. W. Fuel Co.....	Est. No. 1, fuel.....	75.77
9025	The Crane & Ordway Co.....	Pipe, pipe fittings, etc.....	26.03
9026	Robt. W. Hunt & Co.....	Inspecting pipe .....	66.36

## LIST OF VOUCHERS—Continued.

SEPTEMBER, 1897—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
9027	Mitsch Wagon & Car. Co.....	Blacksmithing .....	2.28
9028	D. L. Bell.....	Cement .....	43.45
9029	Geo. J. Mitsch & Co.....	Supplies .....	13.55
9030	Robinson & Cary Co.....	Valves, waste, etc.....	75.17
9031	Henry Orme .....	Est. No. 3, special castings....	291.16
9032	American Hoist & Derrick Co....	Two 12-inch iron blocks.....	6.50
9033	Jno. Martin Lumber Co.....	Lumber and posts .....	47.73
9034	Jno. Caulfield, secretary.....	Cash advanced .....	94.05
9035	C. Neumann .....	Meals, account right of way suit .....	18.90
9036	South Park Foun. & Mach. Co...	Est. No. 5, valves.....	60.50
9037	S. C. Smith.....	Team to Centerville.....	15.50
9038	Pittsburg Meter Co.....	Est. No. 3, meters.....	400.00
9039	Fairbanks, Morse & Co.....	Est. No. 2, laying water pipe, etc.....	1,253.99
	Total .....		\$43,367.78

## LIST OF VOUCHERS—Continued.

OCTOBER, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
9040	C. L. Horst, city treasurer.....	Interest on bonds due Nov. 1, 1897.....	\$8,750.00
9041	South Park Foun. & Mach. Co..	Est. No. 6, valves.....	476.00
9042	South Park Foun. & Mach. Co..	Est. No. 3, fire hydrants.....	155.00
9043	Pioneer Press Co.....	Job printing.....	60.75
9044	St. Paul Lime & Cement Co.....	Drain tile.....	12.00
9045	Thos. Brennan Lumber Co.....	Lumber.....	58.87
9046	Boeringer & Son.....	Repair Eng. instruments.....	5.05
9047	St. Paul & Duluth R. R. Co.....	Freight on Venturi meter.....	51.50
9048	Chas. Friend & Son.....	Saddlery, hardware, etc.....	1.25
9049	Bohn Mnf'g. Co.....	Two slat doors.....	4.00
9050	Griggs Bros.....	Hay.....	21.26
9051	E. A. Brown.....	Nickel timer to test wells.....	7.50
9052	A. W. McGuiggan.....	Map trays, etc.....	3.65
9053	John A. Lavalley.....	Board foreman.....	3.75
9054	Fielding & Shepley.....	Repairing pavement.....	85.55
9055	E. Sawyer, treas. G. N. R. R. Co.	Labor, Rice street main.....	6.04
9056	Pittsburg Meter Co.....	Est. No. 4, meters.....	400.00
9057	South Park Foundry.....	Hydrant tops, etc.....	36.44
9058	C. L. Horst, city treasurer.....	Pay roll for September.....	4,188.09
9059	A. Decker & Co.....	Nails and tools.....	5.16
9060	Washburn Building.....	Electric light.....	5.00
9061	Dan Cashill & Co.....	Horse shoeing.....	4.00
9062	D. L. Bell.....	Cement.....	354.70
9063	J. G. Duggan.....	Blacksmithing.....	6.05
9064	Chas. Friend & Son.....	Harness fittings.....	4.40
9065	P. N. Lindquist.....	Horse shoeing.....	4.00
9066	Farwell, Ozmun, Kirk & Co.....	Hardware.....	.25
9067	M. F. Brennan.....	Livery.....	2.00
9068	Nimis & Meyer.....	Wire, etc.....	5.40
9069	Diebold Safe & Lock Co.....	Changing combination safe.....	1.00
9070	Scheffer & Rossum.....	Leather for dash pots.....	1.20
9071	Cornplanter Oil Co.....	Gasoline.....	1.20
9072	T. L. Blood & Co.....	Oil, brush, etc.....	1.88
9073	The Western Supply Co.....	Pig tin, pipe, etc.....	44.54
9074	Brown, Treacy & Co.....	Stationery.....	9.28
9075	St. Paul Furniture Co.....	Stationery cabinet, etc., office..	33.50
9076	Wyckoff, Seamans & Benedict...	Typewriter supplies.....	9.35
9077	H. C. Boyeson Sta. Co.....	Stationery.....	8.00
9078	H. E. Wedelstaedt & Co.....	Stationery.....	4.78
9079	Boeringer & Co.....	Drawing material.....	1.25
9080	Foley Bros. & Kelly Merc. Co....	Oil, soap and lye.....	27.99
9081	N. W. Fuel Co.....	Est. No. 12 and final, fuel, 1896	382.88
9082	Henry Orme.....	Est. No. 4, special castings....	22.29
9083	South Park Foundry & Mach. Co.	Est. No. 7, valves.....	30.25
9084	South Park Foundry & Mach. Co.	Est. No. 4, fire hydrants.....	31.00
9085	South Park Foundry & Mach. Co.	Machine work.....	10.54
9086	Crane & Ordway Co.....	Pipe fittings.....	11.51
9087	Robinson & Cary Co.....	Pipe fittings.....	38.58
9088	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
9089	Jno. Martin Lumber Co.....	Lumber for meter boxes, etc.....	62.56
9090	Pittsburg Meter Co.....	Meters.....	400.00
9091	C. W. Peterson.....	Taking care of boat, Lake Phalen	2.00
9092	The Dwyer Heat. & Plumb. Co..	Est. No. 2, service boxes.....	18.50
9093	Bingham & Taylor.....	Est. No. 2, valve boxes.....	378.24
9094	Jas. Shiely.....	Est. No. 2, drayage.....	15.61
9095	Jas. Shiely.....	Hauling pumps, Baldwin Lake to St. Paul.....	5.00
9096	F. A. Leyde.....	Rent of engine.....	21.75
9097	Union Brass & Metal Mnf'g. Co..	Brass work.....	4.00
9098	Peter Johnson.....	Gravel for reservoir weir.....	78.75
9099	E. W. Bazille abstract clerk....	Abstracts.....	4.90
9100	Jos. N. Forcier.....	Board, account right of way....	14.30
9101	S. C. Smith.....	Livery to Centerville.....	3.50
9102	Pioneer Press Co.....	Covers for meter bills.....	11.50
9103	The Samuel Carmen Printing Co.	Printing postal cards.....	2.00

## LIST OF VOUCHERS—Continued.

OCTOBER, 1897—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
9104	The Globe Co.....	Advertising—Dates discounts..	\$4.00
9105	The Dispatch Printing Co.....	Advertising discounts .....	6.00
9106	Mitsch Wagon and Carriage Co..	Blacksmithing .....	19.18
9107	W. H. Bregger.....	Cleaning chimneys, McCarron lake .....	8.00
9108	Dearborn Drug & Chem. Co.....	Oil .....	21.15
9109	N. Feyen .....	Est. No. 5 and final, Centerville contract, 1896 .....	7.38
9110	N. Feyen .....	Est. No. 3 and final, grading contract, 1896 .....	50.00
9111	W. H. Jackson.....	Est. No. 1, dwelling, Center- ville .....	510.00
9112	Fairbanks, Morse & Co.....	Est. No. 3, pipe laying.....	1,672.88
9113	The Gillette-Herzog Mnfg. Co..	Est. No. 1 and final, weir reser- voir .....	446.82
9114	Fielding & Shepley .....	Relaying pavement .....	842.83
9115	John Caulfield, secretary.....	Cash advanced .....	53.16
9116	J. H. Schurmeier Car. Co.....	Repairing pipe cart.....	10.00
	Total .....		\$20,087.69



## LIST OF VOUCHERS—Continued.

NOVEMBER, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
9117	C. L. Horst, city treasurer.....	Interest due Dec. 1, 1897.....	\$7,000.00
9118	Jno. Caulfield, secretary.....	Cash advanced .....	304.17
9119	South Park Foundry & Mach. Co.	Est. No. 3, sluice gate.....	82.30
9120	St. Paul Stone Co.....	Sidewalk tile .....	7.20
9121	Pioneer Press Co.....	Job printing .....	8.25
9122	Viscosity Oil Co.....	Oil .....	10.50
9123	The Menomonie Pressed Brick Co.	Brick .....	118.80
9124	Bohn Mnfg. Co.....	Lumber .....	13.75
9125	Griggs Bros.....	Oats .....	46.32
9126	Robinson & Cary Co.....	Pig lead .....	173.32
9127	J. H. Schurmeier Wag. & Car. Co.	Repair pipe wagon.....	3.25
9128	Thos. Brennan Lumber Co.....	Lumber .....	21.00
9129	St. Paul Lime & Cement Co.....	Sewer brick .....	7.00
9130	C. L. Horst, city treasurer.....	Pay roll for October, 1897.....	4,348.84
9131	Robinson & Cary Co.....	Powder, tools and pipe fittings.	27.97
9132	St. Paul Rubber Co.....	Rubber boots .....	40.56
9133	H. E. Wedelstaedt & Co.....	Stationery .....	5.80
9134	Thompson Rubber Co.....	Tubing .....	1.20
9135	Farwell, Ozmun, Kirk & Co.....	Powder, nails, etc.....	12.33
9136	Crane & Ordway Co.....	Pipe fittings .....	12.65
9137	Foley Bros. & Kelly Merc. Co.....	Oil, candles, etc.....	14.11
9138	Brown, Treacy & Co.....	Pencils .....	2.03
9139	Wyckoff, Seamans & Benedict...	Typewriter supplies .....	5.25
9140	H. C. Boyeson Sta. Co.....	Stationery .....	4.10
9141	Thos. Brennan Lumber Co.....	Lumber .....	28.62
9142	P. N. Lindquist.....	Horseshoeing .....	3.00
9143	W. H. Ulmer.....	Stone for reservoir weir.....	18.65
9144	Barney Building .....	Light Oct. 10 to Nov. 10.....	7.50
9145	N. W. Stamp Works.....	Stencil and dies.....	2.75
9146	N. W. Copper & Brass Works...	Copper floats .....	6.00
9147	And. Martinson .....	Brick work—Reservoir weir.....	60.00
9148	St. Paul Lime & Cement Co.....	Sewer pipe .....	7.20
9149	N. W. Telephone Ex. Co.....	Repairing private line.....	19.00
9150	Pioneer Press Co.....	Rebinding books, etc.....	11.32
9151	Jos. N. Forcier.....	Board of men.....	23.15
9152	Rundle-Spence Mnfg. Co.....	Alabama wrenches .....	4.05
9153	Blackner & Post Pipe Co.....	Culvert pipe .....	197.80
9154	The Palace Furn. & Carpet Co...	Desk—McCarron's Lake station	19.50
9155	Smith & Farwell Co.....	Office stool .....	2.25
9156	Chas. Friend & Son.....	Saddle pad—Harness .....	1.00
9157	Adam Decker & Co.....	Hardware .....	2.98
9158	The Globe Co.....	Advertising .....	1.00
9159	Boeringer & Son.....	Mounting weir design .....	1.65
9160	N. W. Engineering Co.....	Rubber tape .....	.45
9161	F. W. Luley & Son.....	Beef tallow .....	.84
9162	Jno. Martin Lumber Co.....	Lumber .....	59.85
9163	Mitsch Wagon & Carriage Co...	Blacksmithing, etc.....	11.91
9164	J. G. Duggan.....	Sharpening tools .....	6.70
9165	D. L. Bell.....	Cement .....	46.00
9166	Cornplanter Oil Co.....	Oil .....	29.10
9167	Allen & Co.....	Livery .....	2.00
9168	Daniel Cashill & Co.....	Horseshoeing .....	4.00
9169	Wis. Central R. R. Co.....	Freight .....	52.20
9170	Est. of Jas. Giffillan.....	Rent of storage lot.....	25.00
9171	Nicols & Dean.....	Nuts, bolts and washers.....	41.44
9172	Diebold Safe & Lock Co.....	Lock work .....	3.75
9173	N. W. Shot & Lead Wks.....	Lead pipe .....	23.95
9174	Bohn Mnfg. Co.....	Lumber .....	3.85
9175	St. Paul Foundry Co.....	Special castings .....	82.75
9176	Henry Orme.....	Est. No. 5—Special castings...	115.78
9177	W. H. Jackson.....	Est. No. 2—Dwelling, Center- ville .....	425.00
9178	Theophile Vandlac.....	Est. No. 5—Hauling coal to Vadnais .....	18.41
9179	The Samuel Carman Printing Co.	Job printing .....	6.50
9180	Prendergast Bros.....	Plumbing .....	86.82
9181	N. W. Fuel Co.....	Est. No. 2—Fuel .....	236.17
9182	Lefebvre Roofing and Cornice Co.	Roof for reservoir weir.....	68.50
9183	Jas. Shiely .....	Est. No. 3—Drayage.....	38.00
9184	F. A. Leyde.....	Rent of portable engine.....	50.75
9185	Jno. Caulfield, secretary.....	Cash advanced .....	38.68
9186	Fairbanks, Morse & Co.....	Est. No. 4—Laying water pipe.	195.79
Total .....			\$14,362.31



## LIST OF VOUCHERS—Continued.

DECEMBER, 1897.

No. of Voucher.	NAME.	CLAIM.	Amount.
9187	M. F. Brennan.....	Livery .....	\$2.00
9188	Thomas Brennan Lumber Co....	Lumber .....	82.01
9189	Clement Cardinal, Jr.....	Sand for Centerville house.....	6.50
9190	American Hoist & Derrick Co....	Guy cap, clip, etc.....	6.30
9191	The People's Ice Co.....	Ice for office.....	9.25
9192	T. L. Blood & Co.....	Red lead in oil.....	1.44
9193	S. C. Smith.....	Livery—Centerville .....	3.00
9194	St. Paul Lime & Cement Co.....	Sewer brick .....	21.00
9195	W. J. Sonnen, assignee.....	Miscellaneous supplies .....	11.30
9196	John Fitzgerald, superintendent..	Brooms .....	4.40
9197	The Eng. News Pub. Co.....	Manual, American water works ..	7.20
9198	Bohn Mnfg. Co.....	Doors and window frames.....	8.60
9199	Union Brass & Metal Mnfg. Co....	Corporation stops .....	10.80
9200	J. H. Schurmeier Wag. & Car. Co.	Wheels for meter wagon.....	10.00
9201	Jameson, Hevener & Co.....	Hay .....	26.22
9202	W. H. Jackson.....	Est. No. 3 and final—House, Centerville .....	539.00
9203	C. L. Horst, city treasurer.....	Pay roll for November, 1897....	3,732.72
9204	D. L. Bell.....	Cement .....	38.40
9205	P. N. Lindquist.....	Horseshoeing .....	7.00
9206	J. G. Duggan.....	Sharpening tools .....	2.65
9207	Peter Johnson.....	Sand and gravel.....	6.30
9208	H. G. Neal.....	Repairing awnings, etc.....	1.75
9209	N. W. Shot & Lead Works.....	Lead pipe .....	49.69
9210	S. C. Smith.....	Livery to Centerville.....	6.50
9211	H. Pepin.....	Labor on wells.....	1.50
9212	Jos. Garceau.....	Blacksmithing .....	18.90
9213	Joseph N. Forcier .....	Board and stabling.....	2.91
9214	Thos. Brennan Lumber Co.....	Lumber .....	6.77
9215	Daniel Cashill & Co.....	Horseshoeing .....	6.00
9216	Cornplanter Oil Co.....	Gasoline .....	1.80
9217	Minnesota Eng. Works.....	Machine work .....	1.60
9218	Jno. Martin Lumber Co.....	Lumber .....	51.93
9219	The Globe Co.....	Advertising .....	1.00
9220	The Dispatch Printing Co.....	Advertising .....	3.00
9221	Pioneer Press Co.....	Advertising .....	1.50
9222	A. & W. McGuiggan .....	Carpenter work .....	6.75
9223	M. F. Brennan.....	Livery .....	5.50
9224	Tierney & Co.....	Feed .....	5.35
9225	H. C. Boyeson Sta. Co.....	Stationery .....	4.75
9226	Wyckoff, Seamans & Benedict....	Stationery .....	2.90
9227	Brown, Treacy & Co.....	Stationery .....	2.08
9228	H. E. Wedelstaedt & Co.....	Stationery .....	10.43
9229	St. Paul Co-Op. Painting Co.....	Painting and whitewashing.....	15.25
9230	N. W. Fuel Co.....	Est. No. 3—Fuel.....	882.66
9231	Est. of Jas. Gilfillan.....	Rent of storage lot.....	25.00
9232	Allen & Co.....	Livery .....	10.50
9233	The Western Supply Co.....	Lead pipe .....	93.14
9234	Nicols & Dean.....	Machine bolts and washers.....	1.64
9235	Theophile Vandlae.....	Est. No. 16—Hauling coal.....	10.75
9236	Brown, Treacy & Co.....	Printing law briefs.....	36.50
9237	Ogden, Merrill & Greer.....	Candle wick .....	.34
9238	Robinson & Cary Co.....	Galv. lead lined club, etc.....	326.04
9239	Foley Bros. & Kelly Merc. Co....	Engine oil .....	16.89
9240	T. L. Blood & Co.....	Paint .....	.65
9241	The Samuel Carman Printing Co.	Job printing .....	19.95
9242	A. Decker & Co.....	Hardware .....	3.43
9243	D. D. Smith, agent.....	Light for office.....	7.50
9244	The Crane-Ordway Co.....	Pipe and fittings.....	60.38
9245	Farwell, Ozmun, Kirk & Co.....	Powder, lanterns, etc.....	13.48
9246	Gronier & Co.....	Brick .....	134.60
9247	Fairbanks, Morse & Co.....	Iron sleeve for reservoir weir..	1.62
9248	Union Brass & Metal Mnfg. Co....	Brass goods .....	27.75
9249	Thos. Brennan Lumber Co.....	Lumber .....	10.14
9250	Boeringer & Son.....	Frame for weir diagram.....	1.65
9251	Bohn Mnfg. Co.....	Sash .....	1.55

## LIST OF VOUCHERS—Continued.

DECEMBER, 1897—Continued.

No. of Voucher.	NAME.	CLAIM.	Amount.
9252	E. G. Smith.....	Analysis of water.....	\$88.50
9253	Pioneer Press Co.....	Blank books .....	28.75
9254	St. Paul Fire & Marine Ins. Co..	Insurance—Office building .....	20.30
9255	Chas. Friend & Son.....	Fur robe .....	11.00
9256	W. H. Bregger.....	Cleaning flues .....	4.00
9257	H. W. Phillips, Asst. Corp. Atty.	Expenses in lawsuits.....	13.50
9258	Fielding & Shepley.....	Relaying pavement .....	174.41
9259	Pittsburgh Meter Co.....	Est. No. 6—Meters.....	460.00
9260	Martin Feist .....	Lunch for men cleaning conduit	3.50
9261	Dearborn Drug & Chem. Works..	Oil .....	21.60
9262	Jno. Caulfield, Secretary.....	Cash advanced .....	76.09
		Est. No. 2 and final—Smoke stack .....	25.00
9263	Jno. Kenny .....	Brick .....	53.84
9264	Grenier & Co.....	Roof for storage shed.....	88.00
9265	Scribner-Libby Co.....	Balance on salary.....	283.39
9266	R. B. C. Bement.....	Balance on salary.....	708.39
9267	John Caulfield .....	Est. No. 5 and final, laying pipe	275.12
9268	Fairbanks, Morse & Co.....		
	Total .....		\$8,765.50
	Grand total .....		\$299,381.51

# SUPERINTENDENT'S REPORT.

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ST. PAUL, MINN., Jan. 1, 1898.

*To the Board of Water Commissioners,*

GENTLEMEN: I herewith submit my annual report, being for work done by and under your direction for the year 1897.

The accompanying tables will show in detail the character of work done, a summary of which is as follows:

## EXTENSION ACCOUNT FOR 1897..

Water pipe laid on high service.....	8,135.9 feet
Water pipe laid on high service, west side.....	108.0 feet
Water pipe laid on low service.....	2,806.5 feet
Total .....	11,050.4 feet
Or 2.0928 miles on new mains.	
Water pipe relaid.....	5,854.0 feet
Making a total of 3.2015 miles, or.....	16,904.4 feet
The number of fire hydrants placed during the year.....	17
The number of valves placed during the year.....	35
Service pipe connections put in during the year.....	430
New meters placed during the year.....	770
Street springing hydrants placed during the year.....	9

Vadnais lake weir, built for the purpose of measuring the water pumped from artesian wells.

Vadnais lake wells, being two additional wells that were put down the latter part of the year 1896, but were not connected up with the other system of wells until this year; making a total of nine wells that can be put in service when required.

High service reservoir weir built for the purpose of measuring the water that is pumped at the McCarron lake pumping station.

Dwelling house at Centerville, built for the engineer and keeper of the pumping plant.

Fencing right of way on Centerville extension.

Venturi meter, on thirty-inch low service main, near McCarron lake pumping station.

Storage shed at 23 East Fifth street.

The item of relaying mains is mostly for extending a district, so that it can be supplied from Lake Phalen, necessitating putting in of larger

pipe on some streets and the substituting of cast iron pipe in place of cement pipe. All cast-iron pipe taken up was used on other streets as required. For some time past Lake Phalen has been supplying that territory lying east of Broadway (on low service), and the changes made so far extend the district so as to include everything north of Seventh street, east of Jackson street and south of Grove street, and if desired can be extended west as far as Cedar street, thereby adding about fifty (50) acres to be supplied, and in which district there are already about 240 consumers. By arrangement of the gates, the supply can be taken either from Vadnais or Lake Phalen, as the condition of the source of supply may require.

#### FIRE HYDRANTS.

There were seventeen (17) fire hydrants placed during the year, making a total of twenty-two hundred and forty-nine (2,249) that are now in service.

#### REPAIRS ON FIRE HYDRANTS.

The nature and cause of repairs is as follows: Valves cut, twenty-three (23); defective seat washers, six (6); valve nuts loose, two (2); valve rods broken, three (3); casings broken, two (2); top caps broken, two (2); hydrant moved to curb line, one (1); repacked stuffing boxes, one hundred and ninety-five (195); hydrant casings screwed down, one hundred eighty-seven (187); stuffing boxes broken, eight (8); top bolts lost, six (6); stand pipes split, two (2); brass nuts on stuffing boxes broken, two (2). During the year ice was discovered in fifteen (15) hydrants. In some instances the hydrant required attention four different times, and as a general thing it was caused by ground water rising in the casing and on streets that were not sewered.

The average cost per hydrant for maintenance (for labor only) was forty-seven (47) cents, which I consider the minimum figure for their proper inspection and repair, the work having been done by a force of four men and one team, or about 550 hydrants per man, to take care of.

#### STREET SPRINKLING STAND PIPES.

There have been nine (9) new street sprinkling stand pipes placed, and one removed, making a total of two hundred and ninety-one (291) now placed and ready for service. The repairs on the same were as follows: Hose repaired on arm of stand pipe seventy-nine (79); repaired top valves eighteen (18), and new top valves fifteen (15). Leaks on valve rods nineteen (19).

During the year there was placed on two of the regular fire hydrants a street sprinkling crane or attachment, which has a side valve on the stand pipe which has to be closed before a hose can be attached (in case the hydrant is required for fire purposes). These stand pipes should only be placed at such points where temporary service is required, and where the hydrant is located back from the line of cross street, as most all fire

hydrants are located at curb and street line intersections. I think it would not be advisable to have them generally used, except as above mentioned.

The standard wrench lifts the valve on stand pipe, and the attachment should be removed early in the fall.

The average cost per piece for the maintenance of all street sprinkling hydrants for the year (for labor only) was \$1.65.

#### REPAIRS ON MAINS.

There have been eleven (11) leaks on mains during the year, the causes of which were as follows: Defective lead joint, six (6); split pipe, one (1); street settlement on force main, one (1); jarring of pipe at railroad crossing, two (2); plug blown out, one (1).

During the years 1896 and 1897 it has been necessary to repair the twelve-inch main at the crossing of Rice street and the Great Northern Railway at four different times, incurring an expense of about fifty (50) dollars, and by prompt attention no serious results have occurred. The character of the soil is of such a yielding nature that the pipe is constantly being disturbed by the jarring of the ground by passing trains, causing the joints to be drawn apart; therefore, to avoid any serious accident that is likely to occur in the future, I would recommend that the pipe be properly supported by piling as soon as practicable.

#### NEW VALVES PLACED AND VALVES REPAIRED.

There have been thirty-five (35) new valves placed during the year, making a total of 2,094 now in service.

Repairs on valves were as follows:

Valves repacked, thirty (30); new washers, two (2); broken spreader, one (1); rust in pinion wheel, five (5).

#### FIRE EXTINGUISHERS.

There were six (6) four-inch connections put in this year for automatic fire extinguishers. The number and size of the pipe leading from the main are as follows:

One branch with twelve-inch pipe—Wood Harvester Works.

Three branches with six-inch pipe.

Twenty-four branches with four-inch pipe.

Making a total of twenty-eight (28) fire extinguishers put in up to date.

#### SERVICE PIPES.

There have been four hundred and thirty (430) service pipes put in this year, ninety-eight (98) of which were put on low service and three hundred and thirty-two (332) on high service, making a total number of services in the city up to date of fifteen thousand two hundred and twelve (15,212).

There have been seventy-seven (77) leaks repaired, the causes of which were as follows:

Defective joints, twelve (12); defective stops, eighteen (18); defective pipes, thirty-nine (39); pipes frozen, eight (8).

Old cement boxes replaced with standard box..... 14

Top pieces replaced by reason of being broken..... 38



Middle pieces replaced.....	9
Bolts replaced .....	166
New covers placed.....	28

I desire to call your attention to the cost of house services put in this year.

There have been four hundred and thirty (430) connections put in, four hundred and eleven of which were in earth excavation and nineteen in rock excavation. The lead pipe, corporation tap, stop boxes, etc., being in the nature of a fixed charge according as the services are long or short, I have been able to determine the following results as to the actual cost to the department per service in the rock formation, which amount includes labor, materials, repairs, tools, etc.

There was received the sum of \$758.60 for the nineteen (19) services put in the rock formation, some of which were classified as being all rock excavation, and some partly in rock and earth, the actual cost of which was \$795.54, showing a loss of \$36.94.

There was received for the 411 services in earth excavations the sum of \$7,645.83, and deducting the cost of labor, material, inspection, would make a total of \$8,216.58, which leaves a shortage of \$470.75, as a loss to the connection account. The average cost per service in rock excavation (long) equals \$51.66. The average cost per service in rock excavation (short) equals \$30.66.

The above figures represent what the cost is per service on unpaved streets, and the cost of replacing the pavement depending of course on the kind of pavement disturbed, which cost should be added to the above figures.

#### METER DEPARTMENT.

The meter inspector reports that the department has 2,300 registered meters. From this amount should be deducted 110, for those meters that are out of service, leaving a balance of 2,190 that are a source of revenue. Taking the above figures together with an accurate account of the cost of labor and material for setting, and general maintenance for the year 1897, it appears that it will take about ten years for the department to be repaid for the original cost of meters, together with their general maintenance.

There being about seventy-five per cent (75%) of the total number of meters set of one-half-inch and five-eighths-inch size, I have taken these sizes as a basis to determine the above result. The total cost of a five-eighths-inch meter in place ready for service is..... \$10.19

And in addition to the original cost of meter in place there is the following charge for maintenance, etc., and interest on capital invested:

Interest on \$10.19@4½% for 10 years.....	\$4.58	
Cost of maintenance for 10 years @ 32 cents per annum.....	3.20	
		<u>7.78</u>
		\$17.97
By revenue for rent of meter at the present rates @ 15 cents per month and for 10 years.....		\$18.00

## HIGH SERVICE RESERVOIR.

During the month of June the water was drawn off, and the reservoir cleaned, and such parts of the bottom and sides as required attention were replastered with cement. The time required to do this work and refill the reservoir was about nine (9) days. The cost of cleaning (for labor only) was \$169.15.

I urgently recommend that a permanent iron fence be placed around the reservoir, as it will be the means of keeping out a great deal of objectionable matter that gets in there now, and it would also be a guard against accident to persons or children, who during the summer are daily visitors.

## FOUNTAINS FOR PUBLIC PARKS AND DRINKING PURPOSES.

There are twenty (20) fountains in use in public parks, twenty-eight (28) fountains are used for watering animals, and five (5) for drinking purposes, making a total of fifty-three (53) service taps on mains that are constantly in use during the summer months. The placing of an automatic valve to regulate the flow on those fountains used for watering animals should be done as soon as practicable, as fully seventy-five per cent of the water that is let run is absolute waste.

## VADNAIS LAKE CONDUIT.

The brick conduit from Vadnais lake to the terminal chamber at the McCarron lake pumping station has been flushed twice during the year at an expense (for labor only) of \$67.78. In both instances the conduit was found to have been free from all vegetable growths, and in every other respect in good condition. I wish to call your attention to that part of the conduit on the west side of Sandy lake. By reason of a gradual and uniform settlement of the whole line in this vicinity the water line of conduit is from twelve to fourteen inches below the original grade; consequently there is the latter depth of water and sediment that is only partially moved in flushing, which is objectionable for several reasons, and I recommend that it be remedied by putting in a blow-off, which can be done at an expense of about twelve hundred (1,200) dollars.

## CENTERVILLE EXTENSION ACCOUNT.

## CENTERVILLE LAKE INTAKE PIPE.

In my last year's report I referred only to the work as being partially finished, and as it was completed this year I respectfully report as follows, as to the nature, difficulties and cost of the work: The work consisted of the laying of a thirty-six-inch cast-iron pipe into Centerville lake for a distance of 814 feet, to be used as a suction pipe for the fifteen million-gallon pump. For the first two hundred feet from the shore end no difficulty was encountered, as hard clay was found at grade line of pipe. But for the balance of the distance a very treacherous formation was met with,

which necessitated sheeting the ditch with three-inch matched lumber, fourteen to twenty-two feet long, and notwithstanding unusual care was taken in driving it, under runs frequently took place, resulting in the work being flooded, and causing considerable delay and expense which could neither be avoided nor anticipated. This work was done by day labor for \$3,992.07, or about \$4.90 per lineal foot, which price is for excavating, laying the pipe, and all piling, timber and other material used in permanent work, this amount being \$520 less than if the work had been done by contract.

#### CENTERVILLE WELLS.

The earth embankment around fifteen of the wells was washed away during the spring high water, and the boxes should be protected by piling; and I recommend that this work be done at once, as it can be done during the months of February and March at a less cost than at any other time.

#### CENTERVILLE RIGHT OF WAY FENCE.

During the year a contract was let to fence both sides of the right of way fence from the Centerville road near the junction chamber to and around the pump house grounds and Centerville lake, requiring 25,786 lineal feet of fencing, this work, including all the necessary gates, etc., cost \$703.71, or \$0.0272 per lineal foot of fence complete.

#### RIGHT OF WAY.

The amount expended during the year on repairs of right of way has been small. Total expended was as follows:

Canals and ditches.....	\$206.80
Repairs on fence.....	76.08
Culverts and drains.....	201.48
Repairs on roads and bridges.....	23.28

Total .....	\$507.64
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I wish to call your attention to the advisability of the board taking such legal steps as will compel all individuals and corporations to recognize the rights of the Water Board, by requiring them to pay a nominal annual rent wherever they occupy the right of way, or other lands belonging to the board, as uninterrupted possession for the period allowed by law might operate in the future as a bar to absolute ownership. The question of adverse possession, as between an individual and the public, where land has been properly dedicated for public use, has, as a general thing, been decided in favor of the public, notwithstanding adverse occupancy for the period required by law had taken place. But it appears to me that, after looking over the deeds, etc., for some of this property, that the position of the Water Board in some instances is entirely different, as some parts of the Lake Phalen right of way was acquired by purchase, condemnation and easements, all of which was done by a corporation, and

subsequently transferred to the Water Board by direct purchase. And in this transfer I presume it could only convey such title as it had acquired under its corporate power. And where parties have encroached on the right of way and had uninterrupted possession prior and since the purchase by the board, the question might arise in the near future that would cause considerable expense and litigation. I therefore recommend that the board take such action in this matter as in their judgment may seem proper.

#### SIDE-TRACK FOR THE McCARRON LAKE PUMPING STATION.

For the past eight years, being from 1890 to 1897 inclusive, the plant has used about 9,000 tons of coal, for which the department pays about twenty-five (25) cents per ton for hauling, which is included in the price bid for delivery. The question of having a sidetrack put in from the Soo Railroad is of sufficient importance to call your attention to the matter, and I respectfully report as follows: Commencing at a point about 450 feet north of the plant, thence to a point opposite in the rear of the pump house, and by arranging a turn-table at the proper place, four cars can be set, two of which can be unloaded at a time. The accompanying plan represents the manner in which I would suggest the track be placed, the estimated cost of which would be about \$2,500, excepting the cost of ties, metal and labor in laying track.

#### LAKE PHALEN.

The wooden construction at the outlet of the lake, which has served the purpose of a dam to hold the water at a certain elevation has become decayed, and in its place should be built a permanent dam and gate-house. I therefore recommend that this be done sometime during the year.

#### STORAGE SHED AT 23 EAST FIFTH STREET.

The shed was built for the purpose of having the upper story used for the storage of pipes, light specials, etc., and the lower portion to be used as a carriage shed; the total cost of which was \$558.40. There was also built two brick vaults, one of which was for the storage of oils, etc., and the other for the refuse from the stable, the cost of which was \$110.93.

The city engineer, in his report of 1896, recommends the building of a permanent gate-house at the outlet of Pleasant lake. This improvement ought to be done this year, and in connection with the work I think it advisable to straighten the outlet creek, and instead of using a wooden construction to carry the water, I would suggest that brick be used in its place.

The difference in first cost as between wood and brick would be about \$2,500, and considering the many advantages that brick has over wood for this particular location and the purpose for which it is to be used certainly would warrant the expending of the difference in first cost.

Vadnais lake weir and artesian wells, high service reservoir weir, and the Venturi meter have been completed during the year, all of which work was done by day labor by this department, according to plans and specifications furnished by the city engineer, whose report to the board will show the cost of said work. Therefore I omit all detail matter in relation thereto.

#### SUMMARY OF RECOMMENDATIONS.

Gate-house at outlet of Lake Phalen.

Gate-house at outlet of Pleasant lake.

Blow-off on Vadnais lake conduit at Sandy lake.

Iron fence around high service reservoir.

Piling to protect well boxes from ice at Centerville.

Piling to support twelve-inch main at crossing of Rice street and Great Northern Railroad Company tracks.

Side track for unloading coal at McCarron lake station.

Place automatic valves on services supplying fountains with water.

In conclusion, I desire to express my thanks for the courtesy and assistance tendered me in the performance of my duty by your honorable board.

Respectfully submitted,

A. R. STARKEY,  
Superintendent.



## PIPE LAID ON HIGH SERVICE DURING THE YEAR 1897.

Date.	Street.	From Street to Street.	4 Inch.	6 Inch.	12 Inch.	36 Inch.
July 23....	Lombard ave	Milton, 454 feet westerly....	.....	454	.....	.....
July 23....	Milton.....	Victoria to Lombard.....	.....	335.5	.....	.....
July 24....	Greenb'r ave.	Sims to Case.....	.....	332	.....	.....
July 26....	Wells, n. s....	Walsh ave. to a point 286 feet easterly .....	.....	286	.....	.....
July 28....	Cook.....	Courtland to Agate.....	.....	548	.....	.....
Aug. 13....	Van Buren....	Simpson to Asbury.....	.....	434	.....	.....
Aug. 13....	Asbury ave....	Van Buren to Blair.....	.....	307	.....	.....
Aug 7....	Ellis.....	Hampden to Seal.....	.....	941	.....	.....
Aug 7....	Hampden ave	Intersection with Ellis.....	.....	42	.....	.....
Aug. 10....	Sidney ave....	Present terminus to Ellis....	.....	500.5	.....	.....
Sept. 1....	Force main....	At High Service Reservoir....	.....	.....	.....	33
Sept. 22....	Conway.....	Cypress to Earl.....	.....	660	.....	.....
Sept. 25....	Lawson.....	Jessie to Burr.....	.....	661	.....	.....
Sept. 29....	Park ave.....	Winnipeg to Manitoba.....	.....	323	.....	.....
Oct. 1....	Victoria.....	Front to Hatch.....	.....	.....	375	.....
Oct. 4....	Virginia ave.	Fuller to Aurora.....	326	.....	.....	.....
Oct. 22....	Vandalia.....	University ave. to a point 328 feet n of Charles.....	.....	761.3	.....	.....
Oct. 22....	Charles.....	Intersection with Vandalia....	.....	64.3	.....	.....
Oct. 28....	Cook.....	Agate—296 feet easterly....	.....	296	.....	.....
Dec. 4....	Fuller.....	Present terminus to Lexington ave.....	.....	456.3	.....	.....
Total.....			326	7401.9	375	33

Total 4-inch pipe.....	326
Total 6-inch pipe.....	7,401.9
Total 12-inch pipe.....	375
Total 36-inch pipe.....	33

Total on high service..... 8,135.9 feet, or 1.5409 miles.

## PIPE LAID ON LOW SERVICE DURING THE YEAR 1897.

Date.	Street.	From Street to Street.	4 Inch	6 Inch.	8 Inch	12 Inch	16 Inch.
June 14....	Cliff.....	Goodhue to Smith ave.....	.....	250.5	.....	.....	.....
June 14....	Smith ave....	Cliff to McBoal.....	.....	840	.....	.....	.....
June 14....	Banfil.....	Intersection with Smith ave	22	.....	.....	.....	.....
July 12....	Winifred....	Present term. to a point 147 feet west of Bellows.....	.....	47	.....	.....	.....
July 15....	James.....	W. Seventh to Webster.....	.....	494.5	.....	.....	.....
July 17....	Beaumont....	Present term. to intersection with Payne ave.....	.....	60	.....	.....	.....
July 17....	Payne ave....	Present term. to intersection with Beaumont.....	.....	70	.....	.....	.....
Aug. 19....	Kittson's add	Alley, block 4, Broadway to Pine.....	.....	.....	.....	222	.....
Aug. 19....	Pine.....	Tenth to alley, block 4. Kitt- son's add.....	.....	.....	.....	132	.....
Oct. 8....	Tenth.....	Intersection with Broadway.	.....	.....	.....	119	.....
Oct. 8....	Tenth.....	Locust to Grove.....	.....	.....	.....	.....	139
Oct. 12....	Eighth.....	Intersection with Broadway.	.....	.....	55	.....	.....
Nov. 24....	.....	Whitney & Smith's add., al- ley, block 15.....	.....	355.5	.....	.....	.....
Total .....			22	2,117.5	55	473	139

Total 4-inch pipe.....	22 feet
Total 6-inch pipe.....	2,117.5 feet
Total 8-inch pipe.....	55 feet
Total 12-inch pipe.....	473 feet
Total 16-inch pipe.....	139 feet

Total on low service..... 2,806.5 feet, or 0.5315 miles.

## PIPE LAID ON WEST SIDE HIGH SERVICE DURING THE YEAR 1897.

Date.	Street.	From Street to Street.	6 Inch.
May 28....	Cherokee ave.	At intersection with Smith ave.....	108

Total 6-inch pipe..... 108 feet

## PIPE RELAID ON LOW SERVICE DURING THE YEAR 1897.

Date.	Street.	From-To.	4 Inch.	6 Inch.	8 Inch.	12 Inch.	16 Inch.	20 Inch.	24 Inch.
Oct. 16	Broadway...	At intersection with Eighth, 24-inch replaced with.....	...	...	...	...	...	...	8
Oct. 16	Broadway...	At intersection with Tenth, 6-inch cement pipe relaid with..	...	20	...	...	...	...	...
Oct. 16	Broadway...	At intersection with Tenth, 24-inch replaced with.....	...	...	...	...	...	...	17
Sept. 23	Lafayetteave	Grove—50 feet northerly, 16-inch cement pipe relaid with.....	...	...	...	...	50	...	...
Oct. 5	Locust.....	Seventh to Eighth, 16-inch cement pipe relaid with.....	...	...	...	...	65	...	...
Oct. 5	Locust.....	Seventh to Eighth, 16-inch cement pipe relaid with.....	...	...	...	...	...	27	...
Oct. 5	Locust.....	Ninth to Tenth, 16-inch cement pipe relaid with.....	...	...	...	...	70	...	...
Oct. 5	Locust.....	Ninth to Tenth, 16-inch cement pipe relaid with.....	...	...	...	...	...	13	...
April 26	Eighth.....	At intersection with Wacouta, 4-inch relaid with.....	...	...	84	...	...	...	...
Oct. 9	Eighth.....	Minnesota to Locust, 4-inch relaid with .....	...	...	3,182	...	...	...	...
Oct. 9	Eighth.....	At intersection with Minnesota, 4-inch replaced with.....	4	...	...	...	...	...	...
Oct. 9	Eighth.....	At intersection with Locust, 4-inch replaced with.....	7	...	...	...	...	...	...
Sept. 25	Tenth.....	Pine to Locust, 6-inch relaid with .....	...	...	...	846	...	...	...
Aug. 28	Tenth.....	Jackson to Broadway, 4-inch relaid with .....	...	...	...	1,324	...	...	...
Aug. 21	Tenth.....	At intersection with Pine, 6-inch replaced with.....	...	8	...	...	...	...	...
Sept. 4	Minnesota...	At intersection with Eighth, 4-inch replaced with.....	4	...	...	...	...	...	...
Sept. 4	Robert.....	At intersection with Eighth, 6-inch replaced with.....	...	9	...	...	...	...	...
Sept. 4	Jackson.....	At intersection with Eighth, 12-inch replaced with.....	...	...	...	10	...	...	...
Aug. 28	Temperance..	At intersection with Tenth, 4-inch replaced with.....	14	...	...	...	...	...	...
Sept. 4	Temperance..	At intersection with Eighth, 4-inch replaced with.....	6	...	...	...	...	...	...
Aug. 28	Sibley.....	At intersection with Tenth, 4-inch relaid with.....	...	8	...	...	...	...	...
Sept. 11	Sibley.....	At intersection with Eighth, 4-inch relaid with.....	...	4	...	...	...	...	...
Aug. 21	Canada.....	At intersection with Tenth, 6-inch cement pipe relaid with.	...	8	...	...	...	...	...
Aug. 21	Pine.....	At intersection with Tenth, 4-inch replaced with.....	4	...	...	...	...	...	...

## PIPE RELAID ON LOW SERVICE DURING THE YEAR 1897.—Continued.

Date.	Street.	From—To.	4 Inch.	6 Inch.	8 Inch.	12 Inch.	16 Inch.	20 Inch.	24 Inch.
Sept. 18	Pine.....	At intersection with Eighth, 4-inch relaid with.....	...	14	...	...	...	...	...
Aug. 21	John.....	At intersection with Tenth, 4-inch replaced with.....	8	...	...	...	...	...	...
Sept. 18	John.....	At intersection with Eighth, 4-inch relaid with.....	...	6	...	...	...	...	...
Sept. 25	Grove.....	At intersection with Tenth, 6-inch replaced with.....	...	30	...	...	...	...	...
Aug. 28	Wacouta....	At intersection with Tenth, 4-inch replaced with.....	4	...	...	...	...	...	...
Total .....			51	107	3,266	2,180	185	40	25

Total relaid, 5854 feet.

6-inch cement pipe relaid with.....	...	28	...	...	...	...	...	...	...
16-inch cement pipe relaid with.....	...	...	...	...	...	185	...	...	...
16-inch cement pipe relaid with.....	...	...	...	...	...	...	...	40	...
4-inch iron pipe replaced with.....	51	...	...	...	...	...	...	...	...
4-inch iron pipe relaid with.....	...	32	...	...	...	...	...	...	...
4-inch iron pipe relaid with.....	...	...	3,266	...	...	...	...	...	...
4-inch iron pipe relaid with.....	...	...	...	1,324	...	...	...	...	...
6-inch iron pipe replaced with.....	...	47	...	...	...	...	...	...	...
6-inch iron pipe relaid with.....	...	...	...	846	...	...	...	...	...
12-inch iron pipe replaced with.....	...	...	...	10	...	...	...	...	...
24-inch iron pipe replaced with.....	...	...	...	...	...	...	...	...	25
Total .....	51	107	3,266	2,180	185	40	25	...	...

Abandoned or taken out on low service during the year 1897.

Locust, from Tenth to Grove, 110 feet 16-inch cement pipe abandoned.

Tenth, at intersection with Locust, 22 feet 6-inch pipe abandoned.

Goodrich avenue, east of Leech, 6 feet 6-inch pipe taken out.

Wilkin, south of McBoal, 6 feet 6-inch pipe taken out.

## SUMMARY OF WATER PIPE LAID IN THE CITY OF ST. PAUL JAN. 1, 1898

SYSTEM.	4 Inch.	6 Inch.	8 Inch.	12 Inch.	16 Inch.	20 Inch.	24 Inch.	30 Inch.	36 Inch.	Total Feet.	Total Miles.
High Service..	37,749	549,880.9	.....	120,874	87,188	36,224	15,495	9,234	8,946	865,590.9	163.9377
Low Service...	36,589	197,739.5	6,732	50,640	38,067	8,342	8,765	16,436	18	363,328.5	68.8122
W. S. High Service .....	...	23,138	.....	7,219	3,950	.....	.....	.....	.....	34,307	6.4975
Total. ....	74,338	770,758.4	6,732	178,733	129,205	44,566	24,260	25,670	8,964	1,263,226.4	239.2489

Total 4-inch pipe.....	74,338
Total 6-inch pipe.....	770,758.4
Total 8-inch pipe.....	6,732
Total 12-inch pipe.....	178,733
Total 16-inch pipe.....	129,205
Total 20-inch pipe.....	44,566
Total 24-inch pipe.....	24,260
Total 30-inch pipe.....	25,670
Total 36-inch pipe.....	8,964

Grand total ..... 1,263,226.4 feet, or 239.2489 miles.

## HYDRANTS PLACED IN 1896 AND 1897.

No.	LOCATION.	Service.	Double or Single Steamer.	Size of Pipe.	Pressure at Hydrant.
2201	Wabasha, bet. Fifth and Sixth, w. side	Low.....	Double.....	6	36
2202	Sixth, bet. Wabasha and St. Peter, s. side	Low.....	Double.....	8	36
2203	Fifth and Market, 5, e. cor.....	Low.....	Double.....	6	35
2204	Cedar and Second, 22, w. cor.....	Low.....	Double.....	8	39
2205	W. Third, 65 ft. s. of Summit, e. side.	High.....	Single.....	6	59
2206	Oakland and Floral, n. w. cor.....	High.....	Single.....	4	58
2207	Summit, 325 ft. e. of Sixth, n. side...	High.....	Double.....	12	67
2208	Sixth and Summit, s. e. cor.....	High.....	Double.....	6	61
2209	Duke and Grace, n. w. cor.....	Low.....	Single.....	6	37
2210	Duke and St. Clair, s. w. cor.....	Low.....	Single.....	6	34
2211	Robie and Bellows, n. e. cor., West Side	High.....	Single.....	6	93
2212	Robie and Bidwell, n. w. cor., West Side	High.....	Single.....	6	95
2213	Louisa and Hall, s. w. cor., West Side	High.....	Single.....	6	86
2214	Sims and Cypress, n. e. cor.....	High.....	Single.....	6	54
2215	Arcade, 154.5 ft. s. of Wells, e. side...	High.....	Double.....	12	63
2216	Forest, 180 ft. s. of Wells, e. side...	High.....	Double.....	6	62
2217	Geranium and Bradley, n. e. cor.....	High.....	Single.....	6	43
2218	Geranium and Burr, n. e. cor.....	High.....	Single.....	6	55
2219	Westminster and Cayuga, n. w. cor...	High.....	Single.....	6	83
2220	Westminster and York, s. w. cor....	High.....	Single.....	6	77
2221	Agate and Case, n. w. cor.....	High.....	Single.....	6	86
2222	Bohn's factory, 215 ft. e. of Arcade, 357 ft. s. of Wells.....	Low.....	Double.....	16	10
2223	Bohn's factory, 208 ft. e. of Arcade, 380 ft. s. of Wells.....	Low.....	Double.....	16	10
2224	Bohn's factory, 50 ft. w. of Mendota, 320 ft. s. of Wells.....	Low.....	Double.....	16	10
2225	Marshall and Fry, n. w. cor.....	High.....	Single.....	12	34
2226	Marshall and Pierce, n. w. cor.....	High.....	Single.....	12	35
2227	Marshall and Aldin, n. w. cor.....	High.....	Single.....	12	36
2228	Marshall and Herschel, n. w. cor.....	High.....	Single.....	12	35
2229	Grand and Fairview, n. e. cor.....	High.....	Single.....	6	42
2230	Jessamine and Cypress, n. w. cor....	High.....	Single.....	6	36
2231	Lawson and Agate, n. w. cor.....	High.....	Single.....	6	80
2232	Oneida and Grace, s. w. cor.....	Low.....	Single.....	6	34
2233	Smith ave. and McBoal, s. w. cor....	Low.....	Single.....	6	37
2234	Cook and Agate, n. w. cor.....	High.....	Single.....	6	75
2235	Wells and Walsh, n. e. cor.....	High.....	Single.....	6	56
2236	Ellis and Sidney, n. e. cor.....	High.....	Single.....	6	40
2237	Lombard ave., 436 ft. w. of Milton...	High.....	Single.....	6	51
2238	Lombard ave. and Milton, n. w. cor...	High.....	Single.....	6	59
2239	James and Webster, n. w. cor.....	Low.....	Single.....	6	38
2240	Mackubin, 20 ft. n. of alley, bet. Portland and Summit aves.....	High.....	Single.....	6	34
2241	Asbury ave. and Blair, n. w. cor....	High.....	Single.....	6	41
2242	Conway and Earl, n. w. cor.....	High.....	Single.....	6	48
2243	Lawson and Bradley, n. w. cor.....	High.....	Single.....	6	68
2244	Cook, 309 ft. e. of Agate.....	High.....	Single.....	6	82
2245	Victoria and Hatch, s. w. cor.....	High.....	Single.....	12	35
2246	Vandalia and Charles, n. e. cor.....	High.....	Single.....	6	45
2247	Vandalia, 328 ft. n. of Charles.....	High.....	Single.....	6	44
2248	Goodrich ave., 167 ft. e. of Leech...	Low.....	Single.....	6	45
2249	Fuller and Lexington, n. w. cor.....	High.....	Single.....	6	51

New hydrants placed during the year 1897 on high service..... 14

New hydrants placed during the year 1897 on low service..... 3

Total for the year..... 17

DISTRICT.	Double Steamer.	Single Steamer.	Total Number of Hydrants in Each District.
High service .....	11	1,375	1,386
Low service .....	130	642	772
West Side high service.....	.....	91	91
Total .....	141	2,108	2,249

The number and location of the following hydrants are placed on private property. They are of the standard make and can be used in case of fire: Northwestern Cordage Works, 4; W. A. Wood Harvester Works, 11; Northern Pacific Shops, 3; Yoerg's Brewery, 1.

## STREET SPRINKLING HYDRANTS PLACED IN 1897.

No.	LOCATION.	Measurement of Valve from Hydrant.
284	Cherokee and Smith .....	28½ feet
285	Cherokee and Stevens .....	8 feet
286	Cherokee and Page .....	8 feet
287	Cherokee and Winona .....	31 feet
288	Mt. Airy and Linden .....	7½ feet
289	Minnehaha and De Soto .....	6½ feet
290	Winifred and Andrew .....	8 feet
291	Stryker and Isabel .....	8 feet
No. 40 has been removed and a new sprinkling hydrant put up at Gaultier, 110 feet north of Lafond .....		10 feet
No. 87 has been changed to Valley and Canada .....		7½ feet
No. 159 has been moved nearer curb line .....		18½ feet
No. 174 has been moved nearer curb line .....		3 feet
No. 192 has been moved from west side of Snelling and center of Summit avenue to southeast corner of that street intersection.		4 feet
No. 229 has been moved from center of Summit avenue and east side Griggs to southwest corner of that street intersection .....		120 feet
Number placed this year .....		9
Number removed this year .....		1
Total placed to date .....		291



## VALVES PLACED IN 1897.

STREET.	LOCATION.	4-Inch.	6 Inch.	8-Inch.	12-Inch.	16-Inch.	24-Inch.
Asbury ave.....	South line of Van Buren.....	1					
Conway.....	West line of Cypress.....	1					
Cook.....	East line of Courtland ave.....	1					
Ellis.....	West line of Hampden ave.....	1					
Fuller.....	East line of Lexington ave.....	1					
Greenbrier ave....	North line of Sims.....	1					
Lawson.....	West line of Bradley.....	1					
Lombard ave.....	West line of Milton.....	1					
Park ave.....	North line of Winnipeg.....	1					
Sidney ave.....	North line of Ellis.....	1					
Van Buren.....	West line of Simpson ave.....	1					
Vandalia.....	North line of University ave.....	1					
Vandalia.....	North line of Charles.....	1					
Victoria.....	North line of Front.....				1		
Virginia.....	North line of Fuller.....	1					
Banfil.....	West line of Smith ave.....	1					
Beaumont.....	46 feet w. of w. line of Payne ave.....		1				
Broadway.....	9 feet s. of n. line of Tenth M. H.....						1
Cliff.....	28.5 feet e. of Goodhue, n. l. produced.....		1				
Eighth.....	East line of Robert.....			1			
Eighth.....	East line of Wacouta.....			1			
Eighth.....	31 feet w. of e. l. Broadway; reserve.....			1			
Eighth.....	22 feet e. of w. l. Broadway; reserve.....			1			
Eighth.....	1 foot e. of w. l. Olive.....			1			
Kittson's addition	Alley blk. 4, e. l. of Broadway.....				1		
Locust.....	South line of Tenth.....					1	
Payne ave.....	12 feet n. of n. l. Beaumont B. O.....		1				
Smith ave.....	North line of Goodrich ave.....		1				
Tenth.....	West line of Sibley.....				1		
Tenth.....	31 feet w. of e. l. Broadway; reserve.....				1		
Tenth.....	20 feet e. of w. l. Broadway; reserve.....				1		
Tenth.....	West line of Olive.....				1		
Wacouta.....	3 feet n. of s. line of Eighth.....				1		
Whitney & Smith's add.....	Alley, blk. 15; 20 ft w. of e. l. Wacouta.....		1				
Wilkin.....	South of McBoal at edge of bluff B. O.....	1					
Total .....		3	18	5	7	1	1

Total high service..... 20

Total low service..... 15

Total ..... 35

8 4-inch valves have been replaced with 8-inch.

4 4-inch valves have been replaced with 12-inch.

## TOTAL NUMBER OF VALVES ON ALL SYSTEMS JAN. 1, 1898.

SIZES IN INCHES.	High Service.	Low Service.	West Side High Service.	Total.
3 inches .....	23	15		38
4 inches .....	111	118		229
6 inches .....	914	447	38	1,399
8 inches .....	2	26		28
12 inches .....	137	76	8	221
16 inches .....	66	36	5	107
20 inches .....	33	10		43
24 inches .....	9	5		14
30 inches .....	4	5		9
36 inches .....	5	1		6
Total .....	1,304	739	51	2,094

LOCATION, SIZE AND NUMBER OF FEET OF WATER MAINS LAID  
ON LOW SERVICE TO JAN. 1, 1898.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	8-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Alabama.....	Crossing State .....		55							
Armstrong.....	Drake to Chatsworth .....		3865							
Arbor.....	Jefferson to Grace.....		585							
Audubon.....	Seventh to Drake.....		745							
Ada.....	Robie to Winifred.....	334								
Anita.....	Concord—25 feet east.....	25								
Banfil.....	Smith ave. to Duke.....	2302	667							
Bay.....	Stewart to Randolph.....		1944							
Becker Pl.....	Lafayette to De Soto.....		481							
Bedford.....	North to Minnehaha.....		1327							
Belvidere.....	Andrew to Concord.....		1647							
Bradley.....	100 feet south of Grove to Minnehaha.....	498	1502							
Bellows.....	Winifred—25 feet north.....		25							
Beaumont.....			1881							
Broadway.....	Mississippi river to University	498	1735			1938		1741		
Bruno.....	East of Lafayette.....		47							
Bancroft.....	Concord to Congress.....		935							
Bidwell.....	Isabel to Congress.....		302							
Burr.....	Collins to Fauquier.....		1685							
Brunson.....	Partridge to North.....		788							
Canada.....	Ninth to University.....		2055							
Cedar.....	Summit to Second.....		289	176	2573		614			
Chestnut.....	Seventh to Washington.....		1235							
Colborne.....	Jefferson to Superior.....		1763							
College.....	Cedar to Smith ave.....		1670							
Collins.....	Lafayette to Bedford.....		1016							
Cross Miss. river.....	Broadway to State.....					1089				
Concord.....	Isabel to Belvidere.....				6860					
Congress.....	350 feet east of Bancroft to Charlton.....	392	6425							
Chicago.....	Wabasha to S. Robert.....		741							
Colorado.....	R. R. to Parnell.....		1240							
Clinton.....	Congress to Winifred.....		403							
Columbia.....	Glencoe to Pennsylvania.....		745							
Cliff.....	Goodhue to Smith ave.....		250.5							
Decatur.....	Bedford to Beaumont.....		710							
De Soto.....	Hopkins to Fauquier.....		453		1540					
Douglas.....	Seventh to Ramsey.....		1144							
Duke.....	Cascade to St. Clair.....		1893							
Dousman.....	Von Minden to Goodhue.....		576							
Delos.....	Greenwood to Bellows.....		2911							
Daly.....	James to Jefferson.....		1050							
Dearborn.....	Robert to Gorman.....		705							
Eagle.....	Spring to Seventh.....		1449							
Eighth.....	Wabasha—110 ft. east of Neill	1425		3321						
Eleventh.....	Cedar to Broadway.....		1238							
Elm.....	Exchange to C. M. & St. P. R. R.....	406								
Exchange.....	Wabasha to Wilkin.....	3962	323							
Eaton.....	At Indiana and Fairfield crossing.....		51			100				
Edgerton.....	Minnehaha to Reaney.....		328							
Erie.....	St. Clair to Cascade.....		1807							
Emma.....	Western to Short Line.....	373								
Fairfield.....	State to Wabasha.....		2512							
Fauquier.....	Payne to De Soto.....				1982					
Fifth.....	Third to Kittson.....	1458	3120		2438					
Fort.....	Seventh to Tenth.....					1616				
Fourth.....	Exchange to 762 feet east of Kittson.....		4865		2679					
Fourteenth.....	Broadway to Robert.....		1368							
Franklin.....	Elm to Ninth.....	3308								
Fillmore.....	Wabasha to State.....		2808							



## WATER MAINS ON LOW SERVICE—Continued.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	8-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Ramsay.....	Seventh to Pleasant.....		1352			307				
Randolph.....	Webster to Milton.....		757		2818					
Richmond.....	Seventh and Goodrich.....		90							
Robert.....	Elizabeth to Central.....		8881							
Reaney.....	St. Paul & Duluth R. R. to Edgerton.....		905							
Rosabel.....	Union depot grounds to Sev- enth.....		1598							
Robie.....	State to Andrew.....		2341							
St. Clair.....	Cliff to Colborne.....		985		112					
St. Peter.....	Third to College.....		2866							
Seventh.....	Duluth Railroad to Tuscarora	350	1090		470	15656	1508			
Second.....	East of Robert.....		18							
Sherman.....	Bluff to Pleasant.....		1937							
Sixth.....	Kittson to Pleasant.....	1896	2044	3235						
Sibley.....	Levee to Norris.....	1626	1462							
Smith ave.....	College to Cliff.....		3764							
Somerset.....	John to Pine.....		669							
Spruce.....	Sibley to Wacouta.....	393								
State.....	Mississippi river to West Side pump house.....					7704				
Summit ave.....	Robert to Cedar.....		859							
Stryker.....	George to Prospect Ter.....		2106							
Stewart.....	Tuscarora to Bay.....		909							
Temp'rance.....	Eighth to Thirteenth.....	1569								
Tenth.....	Grove to College.....	441	1255		2289	139	1390			
Third.....	Pleasant to west end of Third St. bridge.....		847		6648					
Thirteenth.....	Pine to Jackson.....		2075							
Thompson.....	Ramsey to Pleasant.....		545							
Twelfth.....	Pine to Cedar.....	290					1274			
Toronto.....	Seventh to Jefferson.....		692							
Tennessee.....	Crossing State.....		51							
Tuscarora.....	Stewart to Milton.....		2624							
Van Slyke Court.....	Broadway to Olive.....	557								
Von Minden.....	Dousman to Western.....		897							
View.....	Seventh to Palace.....		2081							
Wacouta.....	Union Depot grounds to Spruce	783	118		1736					
Walnut.....	100 feet south of I. P. to Pleasant.....	2420								
Warsaw.....	Audubon to Palace.....		1030							
Washington.....	Chestnut to Seventh.....	1047			1236					
Waverly Pl.....	Lafayette to John.....		411							
Webster.....	Clay to Seventh.....		316							
Western ave.....	Milwaukee Ry. to Pleasant.....		2550							
Westminster.....	Waverly place to N. P. Ry.....		1022							
Willis.....	Fifth to Seventh.....	550								
Wilkin.....	Short Line Ry. to Pleasant.....		1209							
Winifred.....	Andrew—147 ft. w. of Bellows.....		5587							
Whitney & Smith's add.....	Alley, blk. 15.....		355.5							
Woodward.....	Bradley to John.....	683								
Wabasha.....	Goff to Summit.....		6965							
Watson.....	View to Chatsworth.....		2133							
Winslow.....	Isabel to Prospect Ter.....		745							
Yankee.....	Seventh to Dousman.....	678								
Main old line.....	Fauquier to Lake Phalen.....					6060		7024		
Total .....		36589	197739.5	6732	59640	38067	8342	8765	16436	18
Total 4-inch pipe.....		36589								
Total 6-inch pipe.....		197739.5								
Total 8-inch pipe.....		6732								
Total 12-inch pipe.....		50640								
Total 16-inch pipe.....		38067								
Total 20-inch pipe.....		8342								
Total 24-inch pipe.....		8765								
Total 30-inch pipe.....		16436								
Total 36-inch pipe.....		18								

Total ..... 363328.5, or 68.8122 miles.



LOCATION, SIZE AND NUMBER OF FEET OF WATER MAINS LAID ON  
HIGH SERVICE TO JAN. 1, 1898.

STREET.	FROM STREET TO STREET.	4-Inch.	6 Inch.	12-Inch.	16-Inch.	20 Inch.	24-Inch.	30-Inch.	36-Inch.
Arlington.....	Greenbrier to Payne.....	650							
Arundel.....	Summit to Lafond.....	2553							
Ashland.....	Western to Oxford.....		7203						
Aurora.....	Robert to Chatsworth.....		7814						
Arcade.....	Third to Rose.....		1070	5382					
Astoria.....	St. Anthony to Milwaukee.....		275						
Argyle.....	Front to Van Slyke.....	370	831						
Albemarle.....	Atwater to Front.....	1293							
Arch.....	100 feet west of Columbia to Jackson.....		1725						
Atlantic.....	Fauquier to Stillwater.....		1785						
Atwater.....	Rice to Sylvan.....		1142						
Agate.....	Cortland to Jenks.....		2437						
Avon.....	Dayton to Martin.....	1381							
Asbury.....	Van Buren to Blair.....		307						
Bates.....	Murray to Hastings.....		376	3035					
Beech.....	Seventh to Duluth.....		3738						
Blair.....	Western to Fairview.....		4610						
Broadway.....	Thirteenth to Mt. Airy.....		407		533				
Burr.....	C., St. P., M. & O. R. R. to Brainerd.....		3498						
Bradford.....	Hampden to Endicott.....		819						
Bradley.....	Maryland to 236 feet of.....		256						
Burgess.....	At Dale and at Como.....		114						
Bayless Av.....	Raymond to Langford Park.....				2935				
Bayless Pl.....	Raymond to Bayless Ave.....	902							
Burns.....	Mound to Griffith.....		2753						
Blake.....	Raymond to Langford P. P. E.....		282		186				
Beacon.....	University to Shields.....	594							
Buffalo.....	Capitol to Granite.....		631						
Canada.....	University to Valley.....		290						
Capitol.....	Mississippi to Fairview.....		6866						
Carroll.....	Rice to Cleveland.....		13202						
Cedar.....	Summit to Como.....		2486						
Central Av.....	East line of Central Park to Rice.....	557	1254						
Central P D E. & W.....	Summit to Central Ave.....	1209							
Charles.....	Rice to Vandalia.....		10235.3						
Capitol Boul.....	University to Como.....		1076						
Cable.....	Seventh to Margaret.....			650					
Cook.....	Forest to Rice.....		6967						
Conway.....	Earl to Maria.....		3727						
Churchill.....	Front to Van Slyke.....	1103	1263						
College.....	Rice to Third.....		1165						
Como Boul.....	East line of lot 4, block 5, to north line of lot 5, block 1, Warrendale.....		666						
Como Av.....	Park to Dale.....				469	6555			
Chelton.....	Prior to Tatum.....		559						
Cherry.....	267 feet west of Hoffman to Maria.....	267	565						
Case.....	Forest to Terrace.....		345	6551					
Claghorn.....	Lafond to Van Buren.....		628						
Cypress.....	North of Euclid.....	45							
Cromwell.....	Manvel to Cudworth.....		1599						
Cudworth.....	Bayless to Eustis.....		985						
Clark.....	Whitall to Case.....		1308						
Cross.....	Argyle to Lexington.....		966						
Cambridge.....	Princeton to Lincoln.....		1060						
County Rd.....	Langford to Dooley.....				256				
Crocus Pl.....	Goodrich to Fairmount.....	1314							
Chatsworth.....	Evergreen to Van Slyke.....		983						
Cleveland.....	Lincoln to University.....			3411	3313				
Cortland.....	Capitol to Maryland.....		252		4600				
Cayuga.....	Mississippi to Cortland.....		1630						
Carter.....	West line lot 31, block 40, to County road.....		1886						



## WATER MAINS ON HIGH SERVICE—Continued.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Dale.....	Fairmount to Reservoir.....	4800		2110	5280	1453	14500	9234	1560
Dayton.....	Third to Cleveland.....	192	11578	4675					
Duluth.....	Seventh to Omaha Ry.....		434						
Dayton Pl....	West to Maria.....	275							
De Soto.....	Mt. Ida to Lawson.....		3510						
Dawson.....	Arcade to Gotzlan.....		3673						
Dooley.....	County road to 15 feet east of Raymond.....		1327						
Earl.....	Burns to Cook.....			3593	2291				
Edmund.....	Rice to Milton.....		8518						
Eichenwald...	Sixth to Seventh.....		532						
Euclid.....	Maple to Earl.....		2391						
Elfelt.....	Charles to Blair.....	1034							
Edgerton.....	York to Maryland.....			4272					
Everett Ct....	Wheeler to Great Northern Ry.		355						
Ellis.....	Raymond to Hampden.....		1318						
Fuller.....	Rice to Lexington.....		8548.3						
Farrington...	Summit to Lafond.....		3459						
Fauquier.....	290 feet east of Atlantic to Greenbrier.....		6153						
Fifth.....	125 feet east of Hoffman to Maple.....		1543						
Floral.....	Summit to Oakland.....	518							
Fourth.....	Terry to 400 feet west of Maria.....		5342						
Francis.....	Arcade to Cypress.....		1264						
Front.....	Sylvan to Lexington.....		1140	10475	12	12			
Forest.....	Conway to Geranium.....		3113						
Fairmount....	Dale to Milton.....		2931	518					
Fairview St...	Valley to 200 feet north of Mt. Airy.....		578						
Feronia.....	Fairview to Prior.....		1378						
Freemont.....	Earl to Arcade.....		2577						
Fairview Av...	Selby to Capitol.....			2542	1971				
Fry.....	Territorial road to Capitol...	1087	6						
Force Main...	Pump house to reservoir...					7886	70	7386	
Flandrau.....	Harvester to Stillwater.....		595						
Grand.....	Lawton to Cretin.....		8865						
Grove.....	Seventh to Pine.....			2618					
Grotto.....	Lincoln to Lafond.....		4594						
Goodrich.....	782 feet east of Dale to Oxford		5353						
Greenbrier...	Arlington to Magnolia.....	512	332						
Gaultier.....	Sherburne to Cook.....		2730						
Gordon.....	Raymond to Carter.....		1387	693					
Geranium.....	Arcade to Burr.....		1919						
Genesee.....	Mississippi to Buffalo.....		814						
Granite.....	Mississippi to Cortland.....		1622						
Hoffman.....	Clearmont to Seventh.....		2946						
Holly.....	Western to Victoria.....		5287						
Hague.....	Dale to Griggs.....		6512						
Hudson.....	Cypress to Maria.....		2380	194					
Hastings.....	Bates to Hester.....			3066					
Hewitt.....	Aldine to Syndicate.....		4541						
Hope.....	Fourth to Seventh.....		1156						
Hampden.....	Raymond to Hersey.....		1733						
Harvester...	White Bear to Hazel.....			1306					
Hazel.....	Harvester to 300 feet north of Ames.....			980					
Horton.....	Van Slyke to Como Boulevard		419						
Hardebergh Place.....	Lytton place to Atwater.....	349							
Iglehart.....	Wabasha to Cleveland.....		14706						
Jackson.....	Viola to Sycamore.....		236	2237	145				
Jay.....	St. Anthony to Fuller.....		656						
Jenks.....	Forest to Cortland.....		6084						
Jessamine....	Rice to Cypress.....		8880						
Jessie.....	Case to Maryland.....		2635						
Kent.....	Portland to Carroll.....	2201							
Kenwood Pk..	St. Albans around said park.		767						

## WATER MAINS ON HIGH SERVICE—Continued.

STREET.	FROM STREET TO STREET.	4 Inch.	6-Inch.	12-Inch.	16 Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Knapp.....	Langford Ave. to Raymond Ave.....		1838						
Keston.....	Dooley to Doswell.....		924						
Laura.....	Waltham to University.....		1211						
Laurel.....	Nina to Fisk.....		8297						
Lawton.....	Grand to Summit.....		480						
Lawson.....	Earl to Rice.....		5686						
Lincoln.....	Oakland to Finn.....		8390						
Louis.....	Nelson to Fuller.....		2122						
Linden.....	Mt. Airy to Arch.....		696						
Lafond.....	Rice to Milton.....		7340						
Lynhurst, E. and W.....	University to Peronia.....		1850						
Lexington.....	Grand to Van Slyke.....				3818				
Langford, P. P. E.....	Bayless to Knapp.....		415		427				
Langford, P. P. W.....	Bayless to Gordon.....		181	670					
Langford Av.....	Scudder to Dooley.....			1236	838				
Lookout Pl.....	Arkwright to Westminster.....		447						
Litchfield.....	Rice to Sylvan.....		1142						
Leslie.....	Victoria to Chatsworth.....		1256						
Lombard.....	Milton, 454 feet west.....		454						
Linwood Pl.....	Osceola to Lexington.....		2621						
Lytton Pl.....	Rice to Sylvan.....		1112						
Lake Como & Phalen Av.....	At Dale street.....			23					
Mackubin.....	Summit to Edmund.....		3708						
Maple.....	Hastings to Seventh.....		2660	811					
Margaret.....	Gotzian to Greenbrier.....		4782						
Martin.....	Central to Milton.....		7739						
Maria.....	River to North.....		5481						
Marshall.....	Western to 300 feet west of Cleveland.....		2640	10166					
Mendota.....	Hudson to Fauquier.....		655	3286					
Mt. Airy.....	L'Orient to Robert.....		2024						
Maryland.....	Dale to Arcade.....		3855	22					
Marion.....	University to Lafond.....		1639						
Minnehaha.....	Duluth to Tatum.....		4364	7473					
Mound.....	Hastings to 335 feet west of Earl.....		1298	1536					
Milwaukee.....	Merriam Park to Astoria.....		570						
Manvel.....	Robbins to Raymond.....		1142						
Magnolia.....	Cypress to 120 feet east of Mississippi.....		5698						
Mulberry.....	Third to Sixth.....	435							
Milford.....	Rice to Woodbridge.....		655						
McLean.....	Maria to Earl.....		752						
Minneapolis.....	At Dale.....			15					
McMenemy.....	Case to Jessamine.....			1652					
Mississippi.....	Great Northern Ry. to Cayuga.....		1136						
Manitoba.....	Rice to Sylvan.....		1139						
Macalester.....	Summit to Princeton.....		1885						
Mt. Ida.....	De Soto to Rivoli.....		535						
Milton.....	Victoria to Lombard.....		335.5						
Nelson.....	Summit to Western.....		2122						
Nina.....	Summit to Selby.....		800						
North.....	Maria to Seventh.....		1035						
Nourse.....	Gordon to N. P. Ry.....		392						
Oakland.....	Ramsey to Summit Ave.....		3662						
Olive.....	Olmsted to Pennsylvania.....		1057						
Oakley.....	Lynnhurst west to Prior.....		451						
Osceola.....	Pleasant to Chatsworth.....		3709						
Otsego.....	Lafayette to Mt. Ida.....		791						
Park Place.....	Park Drive southwest.....	574							
Park Av.....	Martin to Cook.....		2094						
Princeton.....	Macalester to Baldwin.....		1399						
Pine.....	Grove to Pennsylvania.....		1820		387				
Portland.....	Summit to Victoria.....		5290						
Pennsylvania.....	Olive to Pine.....	505	342						

## WATER MAINS ON HIGH SERVICE—Continued.

STREET.	FROM STREET TO STREET.	4 Inch.	6 Inch.	12-Inch.	16-Inch.	20-Inch.	24 Inch.	30-Inch.	36-Inch.
Plum.....	Maple to Hoffman.....		1150						
Prior.....	Selby to University.....		804	3447					
Payne.....	Omaha Ry. to Ivy.....		5629						
Pascal.....	Minnehaha to Taylor.....		1743						
Pym.....	Bayless to Eustis.....			736					
Priscilla.....	Raymond avenue east.....		542						
Pratt.....	Raymond to Gibbs.....		762						
Phalen.....	Seventh to Stillwater.....			1467					
Pacific.....	Cypress to Hester.....		1260						
Pleasant.....	Oscola to St. Albans.....			569					
Poplar.....	N. P. R. R. yard to Cortland.....		889						
Rice.....	College to Jessamine.....		495	2147	5990	1154			
Robert.....	171 feet south of University to 254 north of same.....		425						
Ronde.....	Rice to Terrace Park Ave.....		10061						
Reaney.....	English to Greenbrier.....		6448						
Ramsey.....	Oakland to Summit.....		1259						
Ross.....	Atlantic to Seventh.....		2467						
Ravoux.....	Rondo to Fuller.....	616							
River.....	Maria to Hoffman.....	359							
Ravine.....	Maple to 344 feet west of Maria.....	1423							
Raymond.....	University to Langford Av.....		3205		1588				
Robbins.....	Bayless to Raymond Pk.....		440						
Rose.....	Arcade to Edgerton.....		1497						
St. Anthony.....	Rice to Cleveland.....		13893						
St. Peter.....	College to University.....		2557						
Selby Av.....	Summit to Prior.....		17002						
Seventh.....	Grove to White Bear Ave.....				15025				
Sherburne.....	Jackson to Chatsworth.....	400	10470						
Sinno.....	Sixth to Seventh.....		541						
Suction main.....	Pump house to terminal.....						925		
Summit Av.....	C. P. D. E. to Baldwin.....	913	5481	13384					
Summit Pl.....	Nelson to Fuller.....		2122						
St. Albans.....	Pleasant to Martin.....	2366	300	556					
Sims.....	Edgerton to Earl.....		4539						
Summit Ct.....	East of Lawton.....		362						
Short.....	Maria to Hoffman.....		591						
Snelling.....	Goodrich to G. N. Ry.....				11195				
Simpson.....	Blair to Hewitt.....		1528						
Sixth.....	Hoffman to Arcade.....		2646						
Sixth.....	College to Summit.....		537						
Sidney.....	Raymond to Ellis.....		1225.5						
Scudder.....	Blake to Langford Ave.....				1347				
St. Clair.....	Victoria to Oxford.....			1935					
Stinson.....	Gaultier to Western.....		1266						
Sycamore.....	Rice to Cortland.....			2509					
Syndicate.....	Lincoln to Summit.....		967						
Stillwater.....	White Bear to Ames.....		906						
Tatum.....	Minnehaha to Chelton.....		541						
Third.....	Cypress to Summit.....	367	4449						
Thirteenth.....	Pine to Broadway.....				778				
Tilton.....	Wabasha to Rice.....		1278						
Thomas.....	Como to Chatsworth.....		7605						
Topping.....	At Como and at Dale.....		118						
Taylor.....	Charlotte to Holton.....		2467						
Territorial road.....	Raymond to Eustis.....		1498						
University.....	Broadway to Cromwell.....		40	6387	3594	19164			
Valley.....	Broadway to Jackson.....				1789				
Viola.....	Jackson to Rice.....		1653						
Van Buren.....	Western to Wheeler.....		6919						
Victoria.....	St. Clair to Hatch.....			375	9518				
Virginia.....	Summit to Como.....	2758	1798						
Vandalia.....	University, north of Charles.....		761.3						
Van Slyke.....	Chatsworth to Lexington.....		1438						
Wabasha.....	Summit to Park Ave.....	537	342						
Western.....	Summit to Como.....			1775	6285				
Williams.....	Olive to Mississippi.....		857						
Waltham.....	Laura to Prior.....	959							

## WATER MAINS ON HIGH SERVICE—Continued.

STREET.	FROM STREET TO STREET.	4-Inch.	6-Inch.	12-Inch.	16-Inch.	20-Inch.	24-Inch.	30-Inch.	36-Inch.
Wayzata.....	At Albemarle.....	.....	90	.....	.....	.....	.....	.....	.....
Wilder.....	Iglehart to St. Anthony.....	.....	1388	.....	.....	.....	.....	.....	.....
Whitall.....	Payne to Clark.....	.....	2301	.....	.....	.....	.....	.....	.....
Walker.....	Hewitt to Great Northern Ry.	807	.....	.....	.....	.....	.....	.....	.....
Wesley.....	Pascal to Fry.....	394	621	.....	.....	.....	.....	.....	.....
Workhouse.....	Around workhouse.....	.....	1043	.....	.....	.....	.....	.....	.....
Wheeler St....	Bayless to Everett.....	.....	.....	1012	.....	.....	.....	.....	.....
Westminster...	Cayuga to Case.....	.....	999	.....	.....	.....	.....	.....	.....
Wheeler Av....	University to Shields.....	.....	588	.....	.....	.....	.....	.....	.....
Woodbridge....	Atwater to Front.....	.....	1297	.....	.....	.....	.....	.....	.....
Winnipeg.....	Rice to Sylvan.....	.....	1142	.....	.....	.....	.....	.....	.....
Wells, N. S....	Edgerton to Arcade.....	.....	2090	.....	.....	.....	.....	.....	.....
Wells, south	From E. to W. end of retain-	.....	.....	.....	.....	.....	.....	.....	.....
side.....	ing wall.....	1130	.....	.....	.....	.....	.....	.....	.....
White Bear....	Seventh to Ames.....	.....	.....	1992	.....	.....	.....	.....	.....
York.....	Forest to Cortland.....	.....	5782	.....	.....	.....	.....	.....	.....
Total.....		37749	549880.9	120874	87188	36224	15495	9234	8946

Total 4-inch pipe.....	37749
Total 6-inch pipe.....	549880.9
Total 12-inch pipe.....	120874
Total 16-inch pipe.....	87188
Total 20-inch pipe.....	36224
Total 24-inch pipe.....	15495
Total 30-inch pipe.....	9234
Total 36-inch pipe.....	8946

Total ..... 865590.9 feet, or 163.9377 miles.

LOCATION, SIZE AND NUMBER OF FEET OF WATER MAINS LAID ON  
HIGH SERVICE, WEST SIDE, TO JAN. 1, 1898.

STREET.	FROM STREET TO STREET.	6-Inch.	12-Inch.	16-Inch.
Annapolis.....	At Manomin.....		100	
Alice.....	Ohio to the park.....	141		
Baker.....	Bidwell to Cherokee.....		3539	
Belvidere.....	South Robert to Oakdale.....	851		
Bidwell.....	Morton to Roble.....		346	362
Bunker.....	Oakdale to Brown.....	1808		
Curtice.....	Oakdale to 250 feet east of Woodbury.....	1437		
Cherokee.....	Annapolis to north line of Smith avenue.....	4349		
	From Annapolis to tank.....		100	
George.....	Stryker to 40 feet west of Manomin.....	3334		
Hall.....	Morton to Louisa.....	894		
Manomin.....	Baker to Annapolis.....		2540	
Morton.....	Robert to Bidwell.....			2672
Oakdale.....	Midway to Curtice.....	1319		
Ohio.....	Winona to Winifred.....	3485		
Orleans.....	Cherokee to Page.....	2517		
Page.....	Robert to Harvard.....	1344		170
Roble.....	Bidwell to Bellows.....	522		
Robert.....	Belvidere to Morton.....		594	606
State.....	Page to Pump house.....			140
Stryker.....	Tyler to Augusta.....	791		
Sidney.....	Ottawa to Cherokee.....	346		
Total.....		23138	7219	3950

Total 6-inch pipe..... 23138  
 Total 12-inch pipe..... 7219  
 Total 16-inch pipe..... 3950

Total ..... 34307 feet, or 6.4975miles.

RECAPITULATION OF THE TOTAL MILEAGE OF WATER PIPES IN THE  
CITY, JAN. 1, 1898.

High service ..... 865590.9  
 Low service ..... 363328.5  
 West Side high service..... 34307

Total ..... 1263226.4 feet, or 239.2489 miles.



## INVENTORY OF STOCK AND TOOLS, JAN. 1, 1898.

## PIPES AND SPECIALS.

381 feet 36-inch pipe (castiron).	1 30-inch open sleeve.
252 feet 30-inch pipe (castiron).	1 24-inch open sleeve.
115 feet 24-inch pipe (castiron).	1 20-inch open sleeve.
170 feet 20-inch pipe (castiron).	2 16-inch open sleeves.
139 feet 16-inch pipe (castiron).	1 12-inch open sleeve.
12 feet 14-inch pipe (castiron).	2 6-inch open sleeves.
194 feet 12-inch pipe (castiron).	1 6x6-inch open sleeve.
37 feet 10-inch pipe (castiron).	7 4-inch open sleeves.
478 feet 8-inch pipe (castiron).	30 iron washers for open sleeves.
3310 feet 6-inch pipe (castiron).	2 36-inch plugs.
50 feet 6-inch pipe (castiron), old.	2 24-inch plugs.
891 feet 4-inch pipe (castiron).	4 20-inch plugs.
3498 feet 4-inch pipe (castiron), old.	3 16-inch plugs.
7 feet 3-inch pipe (castiron).	6 12-inch plugs.
6 feet 10-inch pipe (wroughtiron).	9 8-inch plugs.
168 feet 8-inch pipe (wroughtiron).	16 6-inch plugs.
9 feet 6-inch pipe (wroughtiron).	12 4-inch plugs.
12 feet 4½-inch pipe (wroughtiron).	1 30x 6-inch 4-way branch.
61 feet 4-inch pipe (wroughtiron).	1 24x12-inch 4-way branch.
11 feet 3½-inch pipe (wroughtiron).	1 24x 6-inch 4-way branch.
21 feet 3-inch pipe (wroughtiron).	1 24x 4-inch 4-way branch.
8 feet 2½-inch pipe (wroughtiron).	1 16x16-inch 4-way branch.
1 20-inch ¼-bend.	1 16x12-inch 4-way branch.
1 12-inch ¼-bend.	1 12x12-inch 4-way branch.
4 4-inch ¼-bends, with base.	1 12x 8-inch 4-way branch.
4 6-inch ¼-bends, with base.	3 12x 4-inch 4-way branches.
5 30-inch ¾-bends.	9 6x 6-inch 4-way branches.
5 24-inch ¾-bends.	20 6x 4-inch 4-way branches.
1 20-inch ½-bend.	14 4x 4-inch 4-way branches.
1 16-inch ½-bend.	3 24x 4-inch 3-way branches.
2 12-inch ½-bends.	1 16x12-inch 3-way branch.
1 8-inch ½-bend.	1 16x 6-inch 3-way branch.
15 6-inch ½-bends.	2 16x 4-inch 3-way branches.
10 4-inch ½-bends.	1 16x 3-inch 3-way branch.
2 36-inch sleeves.	1 12x12-inch 3-way branch.
1 30-inch sleeve.	2 12x 4-inch 3-way branches.
2 24-inch sleeves.	5 6x 6-inch 3-way branches.
2 20-inch sleeves.	2 6x 4-inch 3-way branches.
5 16-inch sleeves.	2 6x 4-inch 3-way branches.
7 12-inch sleeves.	6 6x 3-inch 3-way branches.
9 8-inch sleeves.	24 4x 4-inch 3-way branches.
18 6-inch sleeves.	1 24x20x20-inch Y.
19 4-inch sleeves.	1 20x20x20-inch Y.
1 16x4-inch sleeve and gate, Smith patent.	1 12x12x12-inch Y.
3 12x6-inch sleeves and gates, Smith patent.	1 20x12-inch reducer.
2 12x4-inch sleeves and gates, Smith patent.	2 16x12-inch reducers.
3 8x6-inch sleeves and gates, Smith patent.	8 12x 6-inch reducers.
2 8x4-inch sleeves and gates, Smith patent.	1 8x 6-inch reducer.
6 6x6-inch sleeves and gates, Smith patent.	3 6x 4-inch reducers.
5 6x4-inch sleeves and gates, Smith patent.	2 manhole frames.
2 6x2-inch sleeves and gates, Smith patent.	3 manhole covers.
	1 36-inch casting for Pleasant Lake intake.
	1 36-inch sluice gate for Pleasant Lake intake, with revolving stand, spindle and bolts

## LUMBER.

## At Yard—

- 60 pieces sheeting, 8 feet long.
- 1 piece 6x6 inches, 12 feet long.
- 1 piece 6x6 inches, 18 feet long.
- 1 piece 2x10 inches, 15 feet long.

## At Reservoir—

- 12 pieces 5x¼-inch, D. and M., 16 feet long.

## At McCarron Pumping Station—

- 100 pieces 2x8-inch sheeting, 10 feet long.
- 33 pieces 3x12-inch sheeting, 16 feet long.
- 2 pieces 10x12-inch sheeting, 21½ feet long.
- 1 piece 10x10-inch sheeting, 18 feet long.
- 4 new piles 24 feet long.

**At Vadnais Lake Pumping Station—**

- 169 pieces 8x2¼ inches, D. & M., 18 feet long.
- 19 pieces 8x2¼ inches, 7 feet long.
- 15 pieces 8x2 inches, 7 feet long.
- 28 pieces 6x6 inches, 16 feet long.
- 78 tamarack braces, 4 feet long.

**At Centerville Lake Pumping Station—**

- 30 pieces 4x8 inches, 10 feet long.
- 60 pieces 4x6 inches, 14 feet long.
- 9 pieces 2x10 inches, D. & M., 16 feet long.
- 98 pieces 3x10 inches, M., 13 feet long.
- 20 pieces 3x12 inches, D. & M., 20 feet long.
- 30 pieces 5x2 inches, conduit sheeting, 16 feet long.

**COAL AND WOOD.**

- 190 tons 1,745 pounds Youghiogheny coal, distributed as follows:
- 134 tons at McCarron pumping station.
- 20 tons at West Side pumping station.

- 22 tons 1,745 pounds at Vadnais Lake station.
- 14 tons at Centerville Lake station.
- 543 3-16 cords of mixed wood at Centerville Lake.

**OILS AND WASTE, ETC.****At the Different Pumping Stations—**

- 83 gallons cylinder oil.
- 75 gallons engine oil.
- 84 gallons kerosene.
- 75 pounds waste.
- 5 pounds hemp packing.

- 25 pounds piston rod packing.
- 2 pounds rainbow packing.
- 3 pounds boiler compound.
- 3 pounds polishing paste.
- 24 cans lye.
- 30 bars soap.

**MISCELLANEOUS OTHER MATERIAL.**

- 120 fire brick at West Side station.
- 1000 brick at Centerville.
- 5000 brick at yard.
- ½ barrel cement at Centerville.
- 20 barrels cement at yard.
- 570 pounds pig lead at Centerville.
- 4162 pounds pig lead at yard.
- 60 pounds 60 p. nails at Centerville.

**At Centerville—**

- 290 pieces 4-inch tile drain.
- 9 pieces 4-inch sewer pipe.
- 22 pieces 6-inch sewer pipe.
- 2 pieces 12-inch sewer pipe.
- 8 pieces 9-inch sewer pipe at yard.
- 33 pieces 36-inch sewer pipe at McCarron pumping station.
- 90 feet ¾-inch round iron.
- 2 rolls tar paper.

**At Yard—**

- 60 pounds yarn.
- 7 pieces cement tiles.
- 1 barrel rock salt.
- 2 gallons black enamel paint.
- 9 coils old telephone wire.
- 5 pounds plumbago.
- ½ keg blasting powder.
- ½ barrel axle grease.
- 3 pounds No. 9 copper wire.
- 327 pounds scrap lead.
- 200 pounds old brass.
- 1 lot old sheet iron.
- 50 pounds 60 p. nails.
- 125 pounds 30 p. nails.
- 15 pounds 20 p. nails.
- 40 pounds 8 p. nails.

**GATES AND GATE BOXES.**

- 1 20-inch Galvin gate.
- 1 16-inch Coffin gate.
- 5 8-inch Coffin gates.
- 1 6-inch B. & M. gate, old.
- 8 4-inch Coffin gates.
- 1 4-inch B. & M. gate, old.
- 4 4-inch Ludlow gates, old.
- 1 4-inch Eddy gate, old.
- 1 6-inch Ludlow gate, old (single faced).
- 10 4-inch Ludlow gates, old (single faced).
- 8 3-inch Galvin gates.
- 17 gate boxes for 16 to 24 inch gates.
- 10 gate boxes for 12-inch gates.
- 12 gate boxes for 6-inch gates.

- 11 gate boxes for 4-inch gates.
- 6 extra bases for 6-inch gate boxes.
- 6 extra bases for 4-inch gate boxes.
- 8 middle stems for gate boxes.
- 13 covers for gate boxes, flat, for paved streets.
- 108 covers for gate boxes, rounded for dirt streets.
- 1 dome and face for 16-inch Ludlow gate.
- 2 domes for 4-inch B. & M. gate.
- Lot of small duplicates for gate valves.
- 1 pattern divider for 16-inch R. D. W. gate.

- 3 2-inch brass Ls for air vents.
- 5 spindles for 4-inch B. & M. gates.
- 2 spindles for 6-inch B. & M. gates.
- 11 spindles for 16-inch R. D. W.
- 2 spindles for 20-inch R. D. W.
- 1 spindle for 24-inch R. D. W. gate.
- 1 spindle for 16-inch Galvin gate.
- 8 spindles for 4-inch Ludlow gate.
- 4 spindles for 6-inch Ludlow gate.
- 1 spindle for 12-inch Ludlow gate.
- 1 spindle for 16-inch Ludlow gate.
- 1 gate wrench 11½ feet long.
- 5 gate wrenches 8 feet long.
- 2 gate wrenches 6 feet long.
- 2 always-ready wrenches, No. 2½ and No. 3.

## HYDRANTS AND STANDPIPES.

- 9 D. S. hydrants, complete.
- 13 S. S. hydrants, complete.
- 1 D. S. hydrant without casing, reserve.
- 2 S. S. hydrants, without casings, reserve.
- 2 D. S. hydrant casings.
- 1 S. S. hydrant casing.
- 2 hydrant nozzle reducers.
- 2 hydrant caps for gauges.
- 18 hydrant brass top nuts.
- 7 tops for D. S. hydrants.
- 15 tops for S. S. hydrants.
- 12 large caps for hydrants.
- 12 small caps for hydrants.
- 1 set standard samples for hydrants.
- 2 6-inch plugs with 2-inch holes.
- 42 4-inch plugs with 2-inch holes.
- 48 rubber washers for D. S. hydrants.
- 55 rubber washers for S. S. hydrants.
- 16 6-inch bases for hydrants.
- 9 4-inch bases for hydrants.
- 5 D. S. hydrant rods.
- 9 S. S. hydrant rods.
- 10 S. S. hydrant rods, old.
- 10 stuffing boxes for D. S. hydrants.
- 25 stuffing boxes for S. S. hydrants.
- 2 brass ring valves for D. S. hydrants.
- 12 brass ring valves for S. S. hydrants.
- 2 brass seats for D. S. hydrants.
- 12 brass seats for S. S. hydrants.
- 9 globe valves for D. S. hydrants.
- 23 globe valves for S. S. hydrants.
- 8 brass ring valve nuts (for fire hydrants).
- 7 globe valve nuts (for fire hydrants).
- 13 revolving nuts (for fire hydrants).
- 7 5-inch extra brass nozzles.
- 17 3-inch extra brass nozzles.
- 26 Holly hydrant rods.
- 12 hydrant drip boxes.
- 10 sprinkling standpipe casings, complete.
- 3 extra bases for standpipe casings.
- 10 sprinkling attachment casings with box of bolts.
- 12 stuffing boxes for sprinkling attachment.
- 2 sprinkling standpipe casings.
- 13 2-inch top valves for standpipes.
- 12 2-inch top valves for standpipes, old.
- 7 2-inch 45 deg. elbows.
- 7 2-inch 90 deg. elbows, straight.
- 5 2-inch 90 deg. elbows, plain.
- 162 feet 2-inch galvanized pipe.
- 300 feet ¾-inch to 2½-inch galvanized pipe, old.
- 54 pieces 5 feet long 2½-inch hose for standpipes.
- 17 hydrant wrenches.
- 1 spanner.
- 5 socket wrenches for repairs.
- 2 seat wrenches for repairs.
- 3 Coe's wrenches.
- 3 S. wrenches.
- 2 wrenches for standpipes.
- 1 pair connectors.
- 1 pair plyers.
- 1 ½-inch suction drip pump.
- 1 No. 5 chain tong.
- 2 sets of light tackle blocks with ¾-inch rope.
- 2 ratchets.
- 1 stock and dies from ⅜ to 1 inch.
- 2 chains 6 feet long.
- 2 boilers for steaming out frozen hydrants.
- 3 pieces ¾-inch hose for steaming, 16 feet long.
- 22 caps for standpipe casings.

## PIPE-LAYING TOOLS.

- 1 tool box.
- 23 picks without handles.
- 6 sledge hammers.
- 1 striking hammer.
- 4 mauls, complete.
- 6 mauls without rings and handles.
- 24 sledge handles.
- 1 4-legged derrick.
- 2 3-legged derricks.
- 3 pipe-laying chains, 12 feet, 9 feet and 7 feet.
- 1 gearing and drum to derrick.
- 8 turned poles for derrick.
- 1 2-legged derrick for tunnel use.
- 2 2-wheeled pipe trucks with one extra wheel.
- 4 wheelbarrows for tunnel use.
- 1 dirt scraper.
- 2 puddling bars and wrench.
- 1 crowbar.
- 1 crowfoot.
- 4 rock gads.
- 11 rock drills.
- 4 steel wedges.
- 3 hoisting buckets.
- 3 iron bands with screw bolts.
- 1 pipe cutter for 4 to 8-inch.
- 1 pipe cutter for 10 to 16-inch.
- 10 cutting chisels.
- 7 cape chisels.
- 12 caulking sets.
- 11 yarning tools.

19 cold chisels.  
 4 caulking set tongs.  
 3 caulking hammers.  
 11 diamond points.  
 6 iron dirt rammers.  
 3 tamping bars.  
 3 pipe tamping rammers.  
 15 pairs cement pipe molds.  
 10 pounds small rivets to cement mains.  
 6 sand rock picks.  
 1 Smith patent tapping machine for 2 to 6-inch.  
 1 plug and feather drill.  
 1 Edison diaphragm pump with extra handle.  
 2 Bagnall & Land diaphragm pumps with four duplicate pieces.  
 2 3-inch suction hose, 16 feet long.

1 3-inch suction hose, 8½ feet long.  
 1 3-inch suction hose, 5 feet long.  
 3 flanges for 4-inch wrought pipe.  
 4 double tackle blocks with 1¼-inch rope.  
 1 single tackle block with 1¼-inch rope.  
 2 mortar hoes.  
 1 No. 3 pipe chain tong.  
 3 pairs 2-inch extension pipe tongs.  
 1 pair 2-inch pipe tongs.  
 2 pairs 1-inch pipe tongs.  
 2 pairs ¾-inch pipe tongs.  
 3 lead pots.  
 3 furnaces.  
 4 lead ladles.  
 1 lead pot on wheels.  
 14 pipe stirrups.

## CONNECTION STOCK AND TOOLS.

1081 pounds 1½-inch lead pipe.  
 880 pounds 1¼-inch lead pipe.  
 255 pounds 1¼-inch lead pipe, old.  
 734 pounds 1-inch lead pipe.  
 1213 pounds ¾-inch lead pipe.  
 1100 pounds ¾-inch lead pipe.  
 508 pounds ½-inch lead pipe.  
 95 pounds solder.  
 255 pounds solder, old.  
 7 pipes with faucets, 5 feet long.  
 2 Fuller faucets.  
 13 2-inch stop and waste valves, old.  
 9 1½-inch stop and waste valves.  
 8 1¼-inch stop and waste valves.  
 16 1-inch stop and waste valves.  
 56 ¾-inch stop and waste valves.  
 29 ½-inch stop and waste valves.  
 1 2-inch check valve.  
 5 ¼-inch valves.  
 6 1-inch corporation cocks.  
 38 ¾-inch corporation cocks.  
 118 ½-inch corporation cocks.  
 5 unions from ¾-inch to 2-inch.  
 86 plugs from ½-inch to 2-inch.  
 192 Dwyer patent stop boxes.  
 50 Bingham & Morgan patent stop boxes.  
 10 Bingham & Morgan patent bases for stop boxes.  
 1 sample stop box.  
 1 lot of old pieces to stop boxes.  
 25 iron top pieces for cement stop boxes.  
 4 extra castings for stop box covers.  
 162 brass bolts for stop box covers.  
 7 stop box bases.  
 20 goose necks ½-inch to 1-inch for corporation cocks.  
 3 tunneling bars.  
 9 shovels.  
 3 dirt rammers.  
 2 asphalt axes.  
 1 sand auger.  
 2 connection drills.  
 9 drill hole scrapers.  
 1 drill hole pump.  
 3 sand augers.  
 5 sand scoops.  
 10 sand scoop and auger handles.  
 1 electric battery.  
 200 feet connecting wire.

150 dynamite caps.  
 36 pieces blasting timbers.  
 9 blasting chains.  
 1 solder iron.  
 2 solder pots.  
 3 small solder molds.  
 2 gasoline furnaces.  
 1 lead pot furnace.  
 1 hand force pump, old.  
 1 1-inch force pump.  
 49 feet 1-inch hose.  
 21 feet ¾-inch hose.  
 1 pipe cutting machine for ½-inch to 2-inch.  
 2 Mueller tapping machines for ½-inch to 1-inch.  
 1 kit plumber's tools.  
 1 tool box.  
 7 folding rods for turning on and off.  
 7 straight rods for turning on and off.  
 2 pipe rimmer handles.  
 2 2-inch taps.  
 1 1½-inch tap.  
 1 1¼-inch tap.  
 1 1-inch tap.  
 1 ¾-inch tap.  
 1 ½-inch tap.  
 2 ⅝-inch taps.  
 1 2-inch rimmer.  
 1 1½-inch rimmer.  
 1 1¼-inch rimmer.  
 1 1-inch rimmer.  
 2 2-inch drills.  
 1 1½-inch drill.  
 1 1-inch drill.  
 1 ¾-inch drill.  
 1 ½-inch drill.  
 1 ⅝-inch drill.  
 1 extra 13-16-inch drill.  
 1 extra 15-16-inch drill.  
 1 pair of compasses.  
 1 pair of callipers.  
 1 pair of shears.  
 1 ball face hammer.  
 1 draw knife.  
 2 14-inch flat bastard files.  
 2 round files.  
 1 hand axe.  
 1 monkey wrench.  
 1 Stilson wrench.



## STABLE AND YARD.

4 horses.	2 tape lines.
1 light truck.	3 spirit levels.
2 light wagons.	1 work bench with 2 vises.
2 buggies.	1 anvil.
2 light bob sleighs.	1 log hook.
2 cutters.	2 drag forks.
4 sets single harness.	1 peavy.
5 horse blankets.	3 pairs of grab tongs.
22 pairs bedding blankets.	1 pair of ice tongs.
4 robes.	1 $\frac{3}{4}$ -inch hose for washing buggies.
2 manure forks.	1 sand screen.
Quantity feed for horses.	1 bowl and tank for water closet.
2 farmers' kettles.	1 wash basin with 3 marble slabs.
1 box wood stove.	12 sash weights.
18 pairs rubber boots.	1 handsaw.
23 lanterns.	1 garden rake.
7 tubular lanterns.	2 grub hoes, old.
13 lamp globes, extra.	18 jack screws.
2 tents.	1 drag rake.
1 grindstone.	1 1-inch auger.
1 shovel.	3 branding stamps.
1 wheelbarrow.	1 cast shoe, cone-shaped, for 8-inch pipe.
4 brooms.	1 wheel knife for plow.
2 steel brooms.	6 hydrant caps for $\frac{3}{4}$ -inch hose connection.
1 writing desk.	5 2-inch brass nozzle reducers.
4 1-gallon cans.	3 $2\frac{1}{2}$ -inch hose couplings.
1 5-gallon can.	2 2-inch hose couplings.
2 pairs window sash.	200 feet $2\frac{1}{2}$ -inch hose.
1 beam scale.	1 5-inch hose, 5 feet long.
2 platform scales, Fairbanks'.	150 feet 1-inch rope, new.
5 empty kerosene barrels.	36 feet 1-inch rope, old.
1 spade.	213 feet $\frac{1}{2}$ -inch rope, new.
1 garden hose.	200 feet $\frac{1}{2}$ -inch rope, old.
1 plow.	85 feet $1\frac{1}{4}$ -inch rope, old.
1 sod cutter.	300 feet $\frac{3}{4}$ -inch rope, old.
1 well measure windlass.	
6 wire cable couplings.	

## MIDWAY STATION.

**Gates—**

- 1 6-inch gate box, complete.
- 1 valve rod.
- 3 gate wrenches.

**Hydrants—**

- 1 S. Mathew hydrant.
- 5 globe valves.
- 1 ring valve.
- 1 valve seat.
- 1 stuffing box.
- 1 revolving nut.
- 2 hydrant wrenches.
- 1 seat wrench.
- 3 monkey wrenches.
- 4 standpipe wrenches.
- 3 files, 14 inches long.
- 1 rasp, 14 inches long.

**Pipe-Laying Tools.**

- 1 pipe cutter.
- 4 picks.
- 7 shovels.
- 1 set tackle blocks.
- 1 dirt scraper.
- 1 3-legged derrick.
- 1 wheelbarrow.
- 2 16-pound sledges.
- 3 chains, 6 feet long.
- 1 striking hammer.
- 1 pipe rammer.
- 1 tunnelling bar.
- 1 caulking hammer.
- 2 yarning tools.
- 5 caulking sets.
- 6 diamond points.
- 1 cutting chisel.
- 1 cold chisel.

- 3 cape chisels.
- 2 pairs set tongs.
- 1 crowbar.

**Connection Stock and Tools—**

- 3 1-inch corporation cocks.
- 10  $\frac{3}{4}$ -inch corporation cocks.
- 7  $\frac{1}{2}$ -inch corporation cocks.
- 7 1-inch stop and waste cocks.
- 8  $\frac{3}{4}$ -inch stop and waste cocks.
- 1 stop cock rod.
- 8 stop cock poles.
- 2 faucets with 3 feet pipe.
- 15 brass nipples,  $\frac{3}{4}$ -inch to  $1\frac{1}{2}$ -inch.
- 1 Muller tapping machine.
- 1 gasoline furnace.
- 2 solder ladles.
- 1 lead ladle.
- 1 shave hook.
- 1 pair  $\frac{3}{4}$ -inch pipe tongs.
- 2 pairs plyers.
- 1 turn pin.
- 1 bending iron.

**Stable and Miscellaneous—**

- 1 truck.
- 1 manure fork.
- 1 garden hose.
- 1 grindstone.
- 25 feet 1-inch rope.
- 4 lanterns.
- 1 work bench with pipe vise.
- 1 spirit level.
- 1 buck saw.
- 1 handsaw.
- 1 mason's trowel.
- 2 small augers.
- 1 row boat.



## HIGH SERVICE RESERVOIR.

**Dwelling—**

- 4 chairs.
- 1 rocker.
- 1 rug, 7x9 feet.
- 1 table.
- 1 screen door.
- 3 window shades.
- 2 storm doors.
- 2 scythes.
- 4 cellar storm windows.
- 12 storm windows.
- 8 shovels.
- 4 picks.
- 1 lawn mower.
- 5 scythe stones.
- 10 window screens.
- 1 grindstone.
- 2 gate wrenches.
- 1 air vent rod.
- 2 stop wrenches for valves.
- 2 sets sprinkling hose.
- 1 spade.
- 2 rakes.
- 1 sickle.
- 1 manure fork.

- 1 coal stove with 6 pieces stove pipe.
- 1 paint brush.
- 60 feet  $\frac{1}{2}$ -inch rope.
- 6 16-pound sledge hammer.
- 2 mortar hoes.

**Shed—**

- 1 pick.
- 5 shovels.
- 1 sledge.
- 2 lagging caps.
- 2 grub hoes.
- 1 wheelbarrow.
- 1 chain, 9 feet long.
- 2 dirt rammers.
- 6 concrete buckets.
- 6  $1\frac{1}{2}$ -inch pipes, 6 feet long.
- 3 steel brooms.
- 2 wooden scrapers.
- 5 sections  $1\frac{1}{2}$ -inch hose, 50 feet long.
- 3 hose nozzles.
- 4 floating rafts.
- 1 1-gallon oil can.
- 1 bundle shingles.

## McCARRON PUMPING STATION.

- 1 vise.
- 1 set of screw dies and taps from  $\frac{1}{4}$  inch to 1 inch.
- 1 set of pipe dies and taps from  $\frac{1}{4}$  inch to 2 inches.
- 2 pipe cutters.
- 1 pair 2-inch pipe tongs.
- 1 24-inch pipe wrench.
- 1 12-inch pipe wrench.
- 1 24-inch Coe's wrench.
- 1 14-inch Coe's wrench.
- 1 8-inch Coe's wrench.
- 1 portable blacksmith forge.
- 1 anvil.
- 1 sledge hammer.
- 2 hand hammers.
- 1 soft hammer.
- 6 files.
- 2 saws.
- 1 ax.
- 1 hatchet.
- 1  $1\frac{1}{2}$ -ton chain block.
- 1 3-ton chain block.
- 25 feet  $1\frac{1}{4}$ -inch rubber hose.
- 1 24-inch square.
- 6 chairs.
- 2 ladders.
- 2 step ladders.
- 1 good cupboard.
- 1 oil and waste cupboard.
- 1 work bench.
- 5 cuspidors.
- 1 racket.
- 1 racket, brace and bit.
- 4 jack screws.
- 75 feet  $\frac{3}{4}$ -inch rope and block.
- 1 draw knife.
- 1 planer.

- 6 chisels.
- 1 Edison recording gauge.
- 1 Thompson's indicator.
- 1 lot of old pipe and fittings.
- 2 gate wrenches.
- 3 steel brooms.
- 2 brooms.
- 1 pair rubber boots.
- 50 feet  $\frac{3}{4}$ -inch rubber hose.
- 3 oil tanks.
- 3 2-quart oil cans.
- 2 3-quart oil cans.
- 4 hand oilers.
- 1 quart measure.
- 1 12-inch level.
- 1 steel coal wheelbarrow.
- 3 coal scoops.
- 2 coal hammers.
- 1 Fairbanks 6-ton scale.
- 1 Fairbanks 1000-pound scale.
- 1 grindstone.
- 3 large lanterns.
- 4 small lanterns.
- 1 clock.
- 1 writing desk.
- 50 electric lamps.
- 4 shovels.
- 1 water pail.
- 1 Concord buggy.
- 1 regrounding valve machine,  $\frac{1}{4}$  to 4 inch.
- 1 old 54-inch boiler front.
- 1 stove, with pipe at terminal chamber.
- 1 manhole wrench.
- 1 lot of old castings, pipes and fittings from  $1\frac{1}{2}$  and 3-mill pumps.
- 1 set of brass valves from 3-mill pump.

## TOOLS FOR CONSTRUCTION WORK.

- 2 sets heavy tackle blocks and rope.
- 2 sets light tackle blocks and rope.
- 2 sets single tackle blocks.
- 2 dirt scrapers.
- 1 wooden arch center.
- 1 sand screen.
- 2 hand sand screens.

- 2 mortar hoes.
- 3 water buckets.
- 1 spirit level.
- 2 heavy lagging caps.
- 2 light lagging caps.
- 2 cross-cut saws.
- 1 saw set.
- 1 buck saw.

- |                          |  |
|--------------------------|--|
| 2 hatchets.              | 1 plug and feather drill.                                  |
| 2 bridge augers.         | 4 cape chisels.  |
| 1 square.                | 5 cold chisels.  |
| 1 log carrying hook.     | 4 cutting chisels.   |
| 1 ax.                    | 2 diamond points.  |
| 1 4-legged derrick.      | 2 yarning tools.   |
| 6 wheel barrows.         | 2 pipe gaskets.  |
| 1 sledge hammer.         | 2 gasket clamps.   |
| 10 mauls.                | 1 monkey wrench.   |
| 2 grub hoes.             | 3 caulking hammers.  |
| 1 sledge.                | 4 caulking sets.   |
| 3 sand rock picks.       | 1 pair caulking tongs.                                     |
| 4 picks.                 | 1 pair 2-inch extra pipe tongs.                            |
| 20 shovels.              | 1 pair 1½-inch pipe tongs.                                 |
| 5 long-handled shovels.  | 1 lot old rope in pieces.                                  |
| 2 crow bars.             | 1 lot old telephone poles.                                 |
| 1 rock gad.              | 1 large truck for hauling 20 to 36-inch pipes (4 wheeled). |
| 1 tunneling bar.         | 1 large truck for hauling 12 to 20-inch pipes (2-wheeled). |
| 1 sand scoop and handle. |  |
| 1 gasoline blower torch. |  |
| 2 tool boxes.            |  |

## WEST SIDE PUMPING STATION.

- |                               |   |
|-------------------------------|---|
| 1 24-inch pipe wrench.        | 1 steel coal wheelbarrow.                 |
| 1 14-inch Coe's wrench.       | 1 cuspidor.                               |
| 1 hand saw.                   | 1 step ladder.                            |
| 1 ax.                         | 1 set engineer 5-piece brass hand oilers. |
| 1 hatchet.                    | 2½-gallon measures.                       |
| 3 oil tanks.                  | 2 hand oilers.                            |
| 1 1000-pound Fairbanks scale. | 1 set of wrenches for pumps.              |
| 1 vise.                       | 1 set fire tools.                         |
| 1 work bench.                 | 25 feet of ¾-inch steam hose.             |
| 2 coal shovels.               | 1 lawn mower.                             |
| 1 wardrobe.                   | 100 feet of ¾-inch garden hose.           |
| 1 clock.                      | 1 hay rake.                               |
| 3 large lanterns.             | 1 4-inch flue cleaner.                    |
| 1 writing desk.               | 25 feet of 1-inch hose.                   |
| 2 chairs.                     |   |
| 1 gate wrench.                |   |

## VADNAIS LAKE PUMPING STATION.

**Gate House—**

- |                      |   |
|----------------------|---|
| 4 storm windows.     | 2 hammers.                              |
| 4 window screens.    | 2 hand lanterns.                        |
| 2 brooms.            | 5 large globe lanterns.                 |
| 1 steel broom.       | 1 spirit level.                         |
| 1 shovel.            | 1 paint brush.                          |
| 1 galvanized pail.   | 1 hand saw.                             |
| 1 ice chisel.        | 1 wooden rod with ball joint for flue.  |
| 1 ice saw.           | 1 3-inch steel flue cleaner.            |
| 4 steel traps.       | 1 cleaner.                              |
| 2 gate wrenches.     | 3 50-gallon oil tanks.                  |
| 1 gate lock and key  | 1 coal pick.                            |
| 1 boat chain.        | 2 scoop shovels.                        |
| 1 row boat.          | 50 feet 1-inch rubber hose and nozzle.  |
| 1 pair oars.         | 20 feet 1¼-inch rubber hose and nozzle. |
| 1 pair rubber boots. | 3 oil cans.                             |
|                      | 1 automatic oil tilter.                 |
|                      | 1 step ladder.                          |
|                      | 1 shovel.                               |
|                      | 1 pick.                                 |
|                      | 1 vise.                                 |
|                      | 1 steel coal wheelbarrow.               |
|                      | 1 grindstone.                           |
|                      | 1 ax.                                   |
|                      | 1 grub hoe.                             |
|                      | 1 brush hook.                           |
|                      | 1 draw knife.                           |
|                      | 1 writing desk.                         |
|                      | 2 chairs.                               |
|                      | 1 cuspidor.                             |
|                      | 1 iron block plane.                     |
|                      | 1 tray brass oiler.                     |
|                      | 2 steel oilers.                         |
|                      | 1 brace and bit.                        |
|                      | 1 belt punch and rivet set.             |
|                      | 1 1384 scale.                           |
|                      | 1 Fairbanks platform scale.             |

**Dwelling House—**

- 15 storm windows.
- 15 window screens.
- 2 screen doors.
- 1 thermometer.
- 1 hand pump.
- 1 kalsomine brush.
- 2 storm doors.
- 2 ventilators for chimneys.

**Pumping Station—**

- 1 heating stove.
- 1 8-day clock.
- 2 S. wrenches.
- 4 monkey wrenches.
- 2 Stilson pipe wrenches.
- 2 cold chisels.
- 4 files.

## BALDWIN LAKE PUMPING STATION.

- |  |   |
|--|---|
| 1 No. 10 centrifugal pump.                         | 1 3½-inch steam flue cleaner.           |
| 1 force pump for drinking well.                    | 1 4-inch old gate valve.                |
| 1 hand push car.                                   | 1 3-inch old safety valve.              |
| 200 lineal feet second-hand light rail-road track. | 12 brass springs.                       |
| 1 flat boat.                                       | Some old pipe and fittings.             |
| 1 set wrenches for pumps.                          | 2 low pressure pistons.                 |
| 2 gate wrenches.                                   | 1 old smokestack, 34 inches by 45 feet. |

## CENTERVILLE LAKE PUMPING STATION.

- |                              |  |
|------------------------------|--|
| 1 vise.                      | 2 crow bars.                               |
| 1 pair pipe tongs.           | 6 chisels.                                 |
| 1 24-inch pipe wrench.       | 4 files.                                   |
| 1 12-inch pipe wrench.       | 2 caulking tools.                          |
| 1 24-inch Coe's wrench.      | 2 steel hand oilers.                       |
| 1 14-inch Coe's wrench.      | 1 No. 3 Blake boiler feed pump.            |
| 1 8-inch Coe's wrench.       | 1 box stove for wood.                      |
| 1 hand hammer.               | 40 feet stove pipe.                        |
| 1 coal hammer.               | 1 writing desk.                            |
| 2 saws.                      | 1 set steel wrenches for pumps.            |
| 1 hatchet.                   | 1 lantern support.                         |
| 1 ax.                        | 3 cuspidors.                               |
| 3 oil tanks.                 | 8 wooden wheelbarrows.                     |
| 2 1-quart cans.              | 1 empty tool box.                          |
| 2 3-quart cans.              | 1 boat, 16 feet by 4 feet by 14 inches.    |
| 1 steel coal wheelbarrow.    | 1 sand screen.                             |
| 2 coal scoops.               | 1 post auger.                              |
| 1 grindstone.                | 1 roller toboggan.                         |
| 6 large lanterns.            | 1 gate wrench, 4 feet long.                |
| 2 hand lanterns.             | 1 gate wrench, 11 feet long.               |
| 3 bracket lamps.             | 6 granite blocks for monuments.            |
| 1 clock.                     | 1 timber carrier.                          |
| 1 draw knife.                | 200 ½-inch steel bands for wooden conduit. |
| 1 ratchet, brace and bit.    | 6 hand braces.                             |
| 1 chain.                     | 6 ratchet wrenches.                        |
| 1 2-ton chain block.         | 7 scoop shovels, new.                      |
| 1 4-inch steam flue cleaner. | 6 chisels.                                 |
| 25 feet 1½-inch rubber hose. | 5 files.                                   |
| 1 pair rubber boots.         | 11 straight steel wrenches.                |
| 1 ¾-inch auger.              | 3 hand hammers.                            |

# CITY ENGINEER'S REPORT.

OFFICE OF CITY ENGINEER,  
ST. PAUL, MINN., Jan. 1, 1898.

*To the Board of Water Commissioners,*

GENTLEMEN: I submit herewith my annual report of the work of construction, surveys, etc., of the water department which has been done under the direction of the engineering department during the year ending Dec. 31, 1897, together with some recommendations for future extensions.

The following statement embraces the principal contracts and construction work during the year:

Fencing right of way of Centerville conduit line, Joseph Lamotte, contractor, contract finished.....	\$703.71
Ten million gallon pumping engine for McCarron Lake pumping station, E. P. Allis Co., contractors. Contract price.....	22,700.00
Shop inspection of ten million gallon pumping engine at McCarron Lake pumping station. Contract price.....	850.00
New outlet and weir chamber for Pleasant Lake, gate valve and special castings, South Park Foundry, contractors. Contract price .....	257.30
Weir chamber and inlet to reservoir for 36-inch force main. Total cost .....	1,705.25
Thirty-inch Venturi meter for low service main, Builders' Iron Foundry, contractors. Contract price.....	1,151.75
Dwelling house at Centerville Lake pumping station, W. H. Jackson, contractor. Contract finished.....	1,474.00
Boiler for McCarron Lake pumping station, John Kenny, contractor. Contract price .....	1,223.00
New arrangement of discharge and suction main at McCarron Lake pumping station. Special castings, Howard-Harrison Iron Co., contractors. Contract price.....	945.50
Weir at Vadnais Lake pumping station. Total cost.....	1,253.51
Pipe connection for new artesian wells, Vadnais Lake. Total cost .....	1,632.29
Foundation and pier for ten million gallon pumping engine at McCarron Lake station. Total estimated cost.....	2,000.00
Expended in 1897.....	1,600.00

CONTRACTS LET IN PREVIOUS YEARS AND UNDER CONSTRUCTION  
IN 1897.

Otter Lake conduit, Ransome Subway Co., contractors. Contract price .....	\$8,850.79
Estimates allowed in 1897.....	413.29
Fifteen million gallon pumping engine at Centerville Lake pumping station. Contract price.....	20,700.00
Estimates allowed in 1897.....	10,000.00
Centerville extension, wooden conduit, Hennessy & Cox, contractors. Contract price .....	30,758.30
Estimates allowed in 1897.....	1,346.25
Pump house, Centerville pumping station, Hennessy & Cox, contractors. Contract price .....	9,486.00
Estimates allowed in 1897.....	50.00
Boiler at McCarron Lake pumping station, John Kenny, contractor. Contract price.....	1,162.50
Estimates allowed in 1897.....	176.00
Two artesian wells at Vadnais Lake pumping station, S. Swanson, contractor. Contract price.....	1,095.20
Estimate allowed in 1897.....	1,095.20
Smokestack at Centerville pumping station. Contract price...	270.00
Estimates allowed in 1897.....	270.00
Grading on Centerville conduit line, Nicholas Feyen, contractor. Contract price .....	1,145.00
Estimate allowed in 1897.....	50.00

TEN MILLION GALLON PUMPING ENGINE AT McCARRON LAKE  
PUMPING STATION.

In accordance with the recommendations of my last report, a contract was let for a ten million gallon vertical, triple expansion pumping engine for the McCarron Lake pumping station, to E. P. Allis Company, for \$22,700, a remarkably low price, and very considerably below the average bid. The old one and a half-million gallon engine, which was the first pumping engine erected, has been sold to the park board and removed to Lake Como. The foundations for the new engine are nearly completed, and it is expected that the machinery for the new pump will begin to arrive about the middle of January, 1898. With the completion of this engine we shall have a pumping capacity at McCarron Lake of twenty million gallons per day, which ought to be sufficient for the next ten years unless there should be a very large increase in the amount of consumption.

WEIR ON FORCE MAIN.

A weir has been placed on the thirty-six-inch force main which was laid last year from the pumping station to the reservoir, just before the pipe enters the reservoir. This will enable us to test the new ten million gallon pump which was contracted for, and will also enable us to check



from time to time the efficiency of the pump and determine whether the valves are acting properly.

With this weir and the two Venturi meters on the low service line, our annual consumption of water can be determined with great accuracy.

#### VENTURI METER.

A thirty-inch Venturi meter has been purchased and placed in position on the low service thirty-inch main from Vadnais Lake supply, near the terminal chamber, and we shall now be able to determine more accurately the exact amount of water used on this system, and any unusual leakage or waste can be readily detected. Information thus obtained will also be found very valuable in fixing the rate and determining future extensions. The recording apparatus will be placed in the McCarron Lake pumping station as soon as the foundation for the new pump is completed.

#### VADNAIS LAKE PUMPING STATION.

Connections have been made with the two additional artesian wells which were put down last year at the Vadnais Lake pumping station. The total number of artesian wells connected up at this station at the present time is nine; two deep wells, ten inches in diameter, and seven shallow wells, eight inches in diameter, with Cook strainers.

They now furnish, when the plant is in operation, a supply of five million gallons per day. A weir and settling basin has also been put into the discharge pipe between the pumps and the conduit, both to give us an accurate measurement of the water and to determine whether the water cylinders of the pumping engine are filling properly, also to catch any sand pumped from the artesian wells and prevent it from getting into the conduit.

With the addition of the two wells we are getting much better results. The slip of the pump is reduced to about eight per cent, and we are obtaining a duty of fifty-three million foot pounds.

#### EXTENSION OF THE PHALEN LAKE SYSTEM.

A considerable amount of pipe has been relaid in the district between Broadway and Jackson, and Seventh and Grove streets during the past season, as the old pipes, which were the first laid in the city, were becoming too small for the service. Arrangements were made in laying these pipes so that this district, which can be extended west as far as Cedar street, could be supplied both from the Phalen Lake system and from the Vadnais Lake system. This will increase the amount of water supplied from the Phalen Lake system about forty per cent whenever there is a sufficient amount on hand to supply this increased territory. It can at any time be changed to the Vadnais Lake system by shutting off a few valves.

## PLEASANT LAKE OUTLET.

Surveys and plans have been made for putting in an outlet at Pleasant Lake whereby in case of emergency about two feet more can be drawn off the lake at the present time, and the amount of water taken from the lake can be measured accurately. The unusual amount of rainfall and the continued high water in the lake has rendered it inexpedient to do the work during the past season. I would recommend, however, that the plans be carried out at the first favorable opportunity, as the present flume has been in for a number of years, is not in good condition and requires constant watching.

## CENTERVILLE PUMPING ENGINE.

The final test of the fifteen million gallon, vertical, compound condensing engine at Centerville Lake took place August 16-17. The following is the report of Mr. A. Munster, assistant engineer in charge of the same:

ST. PAUL, MINN., Aug. 20, 1897.

Mr. L. W. Rundlett, City Engineer.

DEAR SIR: I herewith submit my report on the duty test of the fifteen million gallon pumping engine at Centerville pumping station.

The test was of twenty-four hours' duration, commencing at noon, August 16th, ending the same hour on the following day.

The pumping chambers did not fill entirely (within 4.5 per cent) owing to insufficient supply of water, and according to the terms of the contract the work performed by the engine on the up-stroke has been determined from the plunger displacement, and on the down-stroke from the weir measurement.

The data obtained by the test are as follows:

Area of pump plunger (square inches).....	1166.63
Length of stroke (feet).....	3
Total number of revolutions.....	44,007
Average suction lift (feet).....	21.13
Average pressure lift (feet).....	26.37
Average quantity of water pumped (cubic feet per second).....	23.65
Total amount of steam (pounds).....	56,551
Duty developed per 1,000 pounds steam (feet pounds).....	109,234,552
Or fifteen per cent above duty guaranteed by the contract (95,000,000).	
The total amount of water pumped (weir measurement) during the twenty-four hours was 15,285,400 gallons, or 1.9 per cent above the guaranteed capacity.	

The following information in regard to the performance of the boiler during the test may be of interest as showing the general efficiency of the plant.

Total amount of coal consumed (pounds).....	6,816
Total amount of ashes (pounds).....	660
Total amount of combustible (pounds).....	6,156

Total amount of water evaporated from 102° (pounds).....	56,551
Evaporation from and at 212° per pound of combustible (pounds)..	10,365
Evaporation from feedwater temperature per pound of coal (lbs.).	8,297

Respectfully submitted,

A. W. MUNSTER,  
Assistant Engineer.

The result is very satisfactory as showing that the engine was fully up to the requirements of the specifications. I would call your attention also to the very excellent results obtained from the boiler. But one tubular boiler was used, sixty inches in diameter, sixteen feet long. It is certainly a good showing for a boiler of that capacity.

#### CENTERVILLE LAKE WELLS.

No long continued test of the Centerville Lake artesian well system, which was completed last year, has been made, for the reason that on account of abundant water supply in the Pleasant Lake system there has been no occasion to take water from the Centerville Lake system since the completion of the plant. Short tests, however, made at different times, have demonstrated that these wells may be expected to furnish about eight million gallons of water per day, which is very close to the amount estimated. The water obtained is of the very best quality and forms a valuable auxiliary to our water supply. It is probable that after being in use for some time and the fine sand pumped out, the wells will develop a still larger supply. With the completion of these wells, and the erection of the wooden conduit, an abundant supply of pure water is secured to the city of St. Paul sufficient for a number of years.

#### SURVEY WORK.

In connection with the suits for damages for flooding hay lands brought by the farmers owning property around Rice Lake careful surveys have been made of all the hay lands that are affected by high water in the Rice Lake system and maps have been made for record and for use in these suits. Observations have also been made of the elevation of the water in the various lakes during the season and also of the velocity of discharge at the outlet of Baldwin Lake through the flume between Baldwin Lake and the succession of small lakes below. Results seem to show that no damage has been occasioned by the flume, and that, in reality, by pumping from Baldwin Lake, it has been a positive advantage in reducing at times the level of the water below the natural outlet.

#### WATER CONSUMPTION.

A careful record has been kept of the water consumption during the year in each system. The results have been tabulated and are shown in Table No. 1.

A comparison with the table of last year shows that the daily average of 7,322,800 gallons is about one million gallons less than last year. This undoubtedly is due to the fact that the rainfall during the summer months was much larger this year, consequently a much less amount of water was used for lawn and street sprinkling than the previous year, also several large consumers have dropped off, obtaining their supply from artesian wells.

The method of charging the consumer for the actual amount of water used is becoming more and more prevalent in all the large cities and towns, and St. Paul has always been in the front rank in adopting and encouraging this system and in making low rates for actual consumption. We have now in St. Paul 2,298 meters, 752 of which were put in during the past season. For the purpose of getting an approximate estimate of the probable waste of water in our distributive system, a record of 215 metered services in the different residence districts of the high service supply has been tabulated, and the consumption per service per day worked out. A census was also taken of the number of people supplied by these services and from this the consumption per capita per day was obtained, all of which results are shown in the following tables:

## CONSUMPTION OF WATER PER SERVICE.

	Number of Services.	Daily Consumption, Per Service, Gallons.
High service .....	8,327	421.2
West St. Paul high service.....	100	381.5
Low service from Vadnais Lake.....	4,162	906.1
Low service from Phalen Lake.....	973	443.9
Total low service.....	5,235	728.8
Total high and low service.....	13,562	539.9

215 metered services in the high service.

## RESIDENCE DISTRICTS.

	1st and 2nd Wards.	Midway District.	7th and 8th Wards.	Total.
Number of services.....	62	73	80	215
Number of people.....	309	343	436	1,088
Number of people per service....	4.984	4.699	5.45	5.06
Daily consumption per serv., gal.	74.32	97.21	177.89	122.07
Daily consumption per capita, gal.	14.34	23.73	31.90	23.494

The services used were especially selected to be representatives of their districts, and while the number of services in the table is entirely too small to draw any positive conclusion (being only about 2.6 per cent of the whole number of services), yet the results obtained seem to be of sufficient importance to justify the careful tabulation of all the metered services, at least on the high service, for next year, in order that more



reliable information may be obtained. The detailed records from which the table is compiled give sufficient evidence of the promptness with which repairs are made when the water wasted by defective plumbing has to be paid for. As no census of the total number of people supplied has been taken, an accurate comparison of the per capita consumption, as per the table, to the actual per capita consumption for the high service cannot be made, but the average metered consumption per service per day as tabulated is only 29 per cent of the actual total for the high service, and assuming the average number of persons per service as obtained from the table, the tabulated per capita consumption would be 28.5 per cent of the actual.

#### 4 PUMPING PLANTS.

By the completion of the Centerville Lake pumping station there is no necessity to operate the Baldwin Lake plant, but as there is not a large amount of capital invested in this plant, I would recommend that it be kept intact at present as a sort of emergency plant which might be used in case anything should happen to the Centerville Lake plant.

The following compilation of the cost of pumping at the several pumping stations shows an increase of duty over last year, which is accounted for by the greater efficiency of the new boiler at McCarron Lake station, the additional wells at Vadnais Lake, and the greater consumption at the West side station.

#### COST OF PUMPING AT THE VARIOUS PUMPING STATIONS.

##### MCCARRON LAKE PUMPING STATION.

			Gallons.
Capacity of Pump No. 1.....			2,000,000
Capacity of Pump No. 2.....			4,000,000
Capacity of Pump No. 3.....			6,000,000
	Gallons.	Pounds of Coal.	No. of Gallons Per Pound of Coal.
Pumps Nos. 1 and 2.....	124,229,200	256,084	485
Pump No. 3.....	1,156,083,140	1,818,124	635
	<hr/> 1,280,312,340	<hr/> 2,074,208	<hr/> 617
Average duty during the year for Engines Nos. 1 and 2.....			58,998,151
Average duty during the year for Engine No. 3.....			77,332,747
Average duty during the year for the whole plant.....			75,069,147
			Cost of Raising 1,000,000 Gallons One Foot
Salaries for 1897.....	\$3,600.00		\$0.019260
Fuel .....	3,968.92		0.021233
Waste, oil and repairs.....	339.13		0.001814
Total .....	<hr/> \$7,908.05		<hr/> \$0.042307



## WEST ST. PAUL PUMPING STATION.

Amount of water pumped (gallons).....	16,018,200	
Amount of fuel consumed (pounds).....	229,800	
Average rate of pumping in 24 hours (gallons).....	43,886	
Average duty during the year.....	12,135,381	
		Cost of Raising 1,000,000 Gallons One Foot.
Salaries for 1897.....	\$1,320.00	\$0.39428
Fuel for 1897.....	356.32	0.10633
Waste, oil for repairs.....	59.82	0.017867
Total .....	\$1,736.14	\$0.508477

## VADNAIS LAKE PUMPING STATION.

Amount of water pumped (gallons).....	290,299,356
Amount of fuel consumed (pounds).....	195,950
Average duty during the year.....	53,168,060

As the pump does not fill within from eight to fifteen per cent, the actual amount of water pumped has been used in figuring the amount of work on the discharge side, and piston displacement for the work on the suction side in the duty given above.

		Cost of Raising 1,000,000 Gallons One Foot.
Salaries for 1897.....	\$754.00	\$0.06641
Fuel .....	371.11	0.03268
Waste, oil and repairs.....	63.32	0.00558
Total .....	\$1,188.43	\$0.10467

## PRECIPITATION, ST. PAUL. 1897.

The total amount of precipitation at St. Paul for the year ending December 31st was 30.52 inches. The record by months is as follows:

January .....	2.13	July .....	6.35
February .....	1.03	August .....	2.18
March .....	2.95	September .....	1.33
April .....	1.56	October .....	1.87
May .....	1.81	November .....	.93
June .....	8.18	December .....	.20

## FUTURE EXTENSION.

By the erection of the pumping plant at Centerville Lake we are now able to utilize the water from Centerville Lake and Peltier Lake, which receive the drainage area of by far the larger portion of the Rice Lake system, including Hardwood Creek and the outlet of Bald Eagle Lake.

To utilize these two lakes and the drainage area to the best advantage, I would recommend again that plans be prepared to cut off the rest of the Rice Lake system by a dam between Peltier Lake and Rice Lake, and that a dredge be bought and put in operation on Centerville and Peltier lakes to excavate a deep connection between these lakes and to remove all the weeds and vegetable matter around the edges of the lakes and deepen them so as to prevent the growth of vegetation during warm weather. By making yearly appropriations for this work we shall be able to get the lakes in proper condition by the time it becomes necessary to draw largely for our water supply, and after this is done a proper connection can be made with Clear Lake and with Forest Lake so that the overflow from Forest Lake can be brought down into this system, and I would further recommend that steps be taken at once to condemn the land which may be necessary for carrying out these plans. The recent suits brought against the water board show that it will be necessary to go through the form of condemnation, even if the property about the lake should be greatly benefited by the improvement.

#### BALD EAGLE LAKE EXTENSION.

The water in Otter Lake is now under control of the water department and can be turned at any time into the Pleasant Lake system by opening a gate. Bald Eagle Lake is only separated from Otter Lake by about 2,000 feet of low marshy land which can be easily ditched. In fact, there was formerly a connection between these lakes which has grown up with weeds. I would recommend that the proper condemnation be made at once so the control may be obtained of the overflow of Bald Eagle Lake, which now runs into the Rice Lake system. This surplus water could then be turned into Pleasant Lake in the spring when that lake is usually low on account of the draft made on it for the water consumption during the winter. It would not be necessary to draw Bald Eagle Lake below its normal condition, but merely to utilize the surplus overflow which now goes in another direction.

Respectfully submitted,

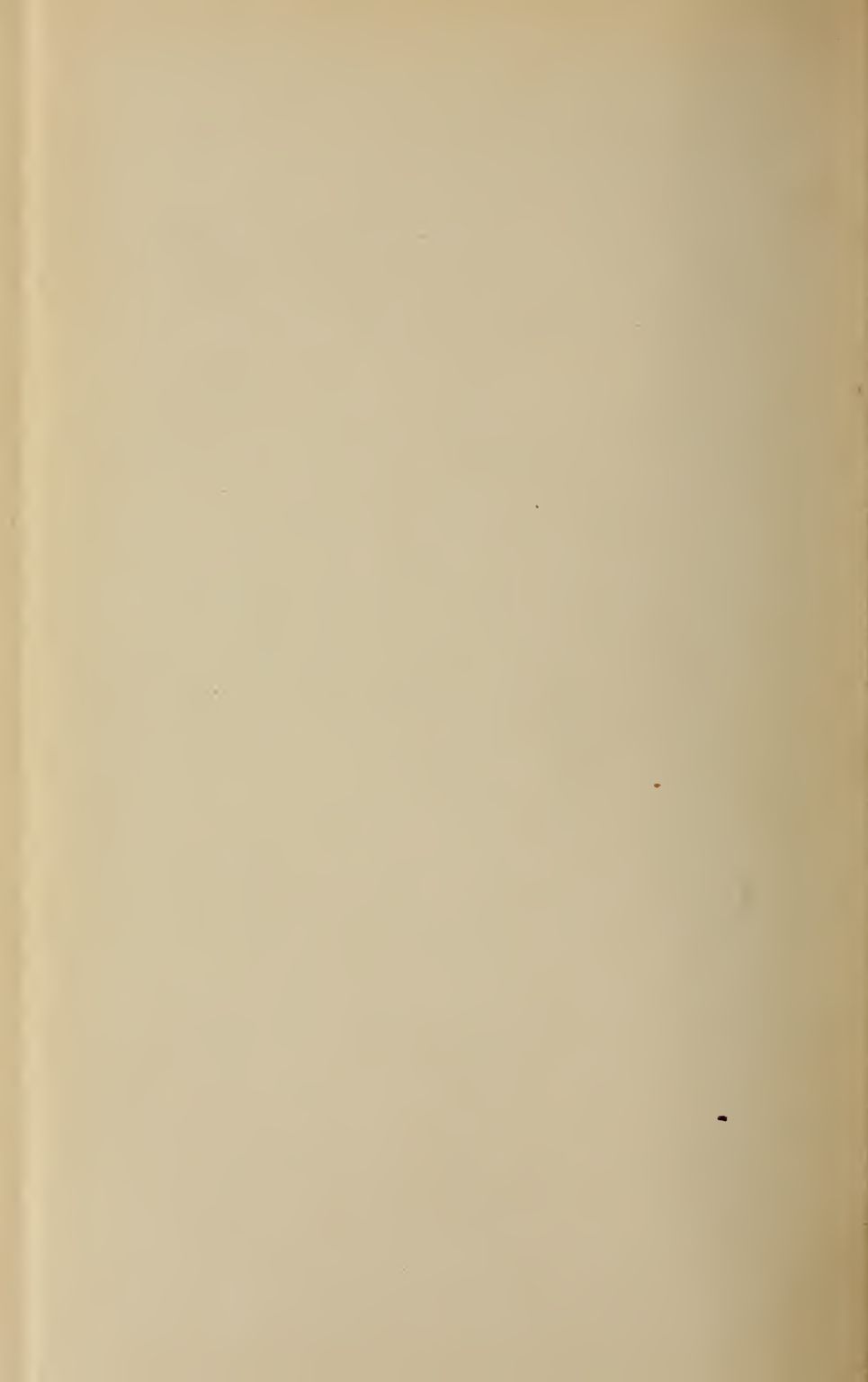
L. W. RUNDLETT,  
*City Engineer.*

# RECORD OF MONTHLY AND ANNUAL RAINFALL, ST. PAUL, MINN.

	1837.	1838.	1839.	1840.	1841.	1842.	1843.	1844.	1845.	1846.	1847.	1848.	1849.	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	Average Rainfall From 1837 to 1898.
January .....	0.27	0.65	1.34	0.49	0.24	0.95	1.15	1.50	0.49	0.52	0.29	0.62	1.09	1.67	0.20	1.09	0.00	0.72	1.67	0.89	3.48	.....	0.50	0.14	0.55	1.35	1.12	0.38	0.65	2.00	0.97	1.71	0.42	1.34	1.61	0.28	1.31	0.49	1.41	0.73	0.55	1.00	0.11	0.81	4.34	0.67	0.64	0.48	0.30	1.76	1.79	0.72	0.55	0.95	1.01	0.29	0.73	1.04	1.05	0.81	2.13	0.964
February .....	0.35	0.76	0.36	0.49	0.21	0.72	1.46	0.72	1.40	0.03	0.11	1.13	0.61	0.83	0.13	0.58	0.01	0.03	0.41	0.18	0.94	.....	0.50	1.15	1.94	0.59	0.93	0.00	1.85	0.30	1.12	1.51	2.83	0.60	0.41	0.26	1.54	1.07	1.72	0.66	0.01	0.67	1.12	0.97	2.55	2.35	0.44	1.27	0.20	0.25	0.89	0.64	0.30	0.50	1.18	1.44	1.87	0.10	0.42	0.17	1.03	0.813
March .....	0.33	0.15	0.71	0.65	1.43	0.44	0.82	0.97	2.80	1.71	0.44	1.71	4.11	2.23	1.23	1.55	0.02	1.03	1.84	0.22	0.79	.....	3.33	1.04	0.15	0.95	1.97	1.28	2.10	1.32	1.00	1.22	0.93	2.10	2.06	1.64	1.34	2.24	2.19	1.43	1.57	1.24	0.97	2.30	1.06	3.25	0.06	1.34	0.55	1.09	0.33	1.11	0.99	1.11	0.94	0.75	1.96	3.28	0.85	2.93	2.95	1.402
April .....	0.95	2.41	2.71	1.55	1.40	2.17	0.75	5.16	3.15	2.90	0.45	0.18	5.62	2.60	2.68	2.16	0.73	2.51	0.28	4.47	4.25	.....	1.70	2.92	2.50	2.67	0.80	0.56	4.29	2.26	2.93	1.31	0.56	1.39	4.25	1.69	2.44	0.95	2.27	2.23	1.92	2.43	0.45	1.58	0.47	1.61	4.92	2.00	3.19	3.67	3.14	5.14	1.14	1.80	1.71	0.97	5.30	4.50	2.09	5.63	1.56	2.363
May .....	2.65	3.05	3.28	2.31	1.50	1.68	3.12	4.50	1.51	2.00	4.96	5.28	6.57	0.57	3.96	2.05	4.08	4.30	1.23	1.62	2.05	.....	4.95	6.85	6.56	1.35	2.87	0.47	4.20	0.39	4.45	3.96	2.34	5.24	2.70	5.71	4.63	1.65	3.06	3.15	5.43	2.33	7.18	2.63	4.34	2.44	2.12	2.09	2.12	0.82	1.60	4.75	2.86	3.66	1.33	5.17	2.66	6.63	2.89	4.67	1.81	3.268
June .....	3.46	4.76	1.80	3.50	4.24	3.73	5.22	1.64	6.80	3.10	2.66	2.83	3.14	4.62	2.15	5.16	7.59	3.31	2.38	0.76	6.74	.....	5.49	5.00	4.86	2.66	0.02	1.62	6.72	6.00	9.55	2.68	2.22	0.79	6.56	3.81	7.74	11.67	4.33	2.02	7.13	3.58	1.76	5.55	2.87	2.68	7.04	3.57	3.73	3.63	2.89	1.95	1.61	5.29	4.08	7.50	2.00	1.51	4.18	3.30	8.18	4.123
July .....	2.73	11.11	3.50	2.89	1.57	1.78	2.09	4.80	2.56	4.95	3.66	4.60	7.59	6.15	2.60	1.57	1.65	3.92	1.32	2.47	0.65	.....	2.95	1.76	2.69	10.15	0.63	4.09	2.55	2.30	2.83	4.05	1.67	3.13	1.48	4.23	3.83	1.94	0.82	2.73	0.52	4.47	9.32	2.75	2.60	2.84	4.33	2.95	5.86	1.44	3.89	5.55	3.08	1.87	2.07	9.04	1.68	0.13	4.12	1.12	6.35	3.398
August .....	1.32	3.08	1.04	3.40	1.17	4.81	1.84	4.37	3.28	3.80	2.49	3.19	9.60	2.97	3.29	0.89	2.57	1.75	4.41	1.09	2.03	.....	2.72	0.88	2.97	4.58	3.19	2.00	9.16	4.73	2.32	3.08	7.62	8.56	4.87	3.52	4.61	3.90	8.74	5.28	2.83	1.43	2.78	3.63	4.55	2.45	1.22	2.89	3.69	2.27	3.37	2.23	3.56	2.20	3.42	3.66	2.40	0.36	2.59	4.48	2.18	3.398
September .....	5.10	0.71	1.61	2.33	6.10	4.83	5.14	4.26	2.21	2.33	4.00	2.46	2.75	1.82	3.64	2.51	2.14	6.55	6.26	3.24	2.46	.....	3.95	4.72	2.67	2.89	1.23	1.14	1.90	2.26	5.71	2.88	19.61	3.28	2.18	5.62	2.56	5.76	2.16	2.99	2.56	2.13	2.26	1.74	9.95	0.27	2.23	4.48	3.52	3.69	4.35	1.70	0.51	2.73	0.58	1.72	2.70	1.82	4.75	2.45	1.33	3.244
October .....	3.15	0.16	2.11	2.21	1.55	*2.11	0.50	0.97	0.66	2.45	0.37	0.68	5.35	0.32	1.18	4.10	0.01	1.23	0.90	3.97	0.00	.....	0.46	4.64	2.80	1.06	1.44	1.69	2.30	2.64	1.01	4.56	0.88	1.95	1.90	0.52	2.57	3.22	1.56	1.27	3.62	1.85	2.56	2.18	4.44	1.99	1.10	2.43	0.93	0.72	1.18	1.10	2.06	2.79	1.57	1.39	1.49	4.49	0.09	3.39	1.87	1.865
November .....	1.37	0.43	1.66	3.22	0.84	3.46	1.43	0.77	0.40	2.10	1.71	0.10	1.40	1.68	2.31	1.92	0.56	0.69	2.38	1.70	5.75	.....	2.01	0.52	2.54	0.59	0.29	1.09	0.23	3.19	0.58	3.69	0.75	1.40	1.41	1.91	0.79	1.99	0.84	0.93	1.24	0.61	1.41	2.93	1.36	1.61	1.01	0.65	0.60	2.07	0.65	0.34	0.97	0.38	1.03	0.36	0.81	0.61	0.85	5.07	0.93	1.536
December .....	2.34	0.45	1.01	0.13	1.42	0.60	0.27	0.58	0.08	0.21	0.66	0.40	1.95	0.04	0.05	2.27	1.11	0.64	1.67	2.01	2.95	.....	0.75	0.41	0.10	1.37	1.30	0.71	2.19	0.50	0.66	0.58	0.96	0.90	1.20	2.08	0.38	0.72	1.56	0.25	1.42	1.04	2.47	2.69	0.53	0.98	1.59	1.93	0.64	1.48	1.47	0.63	1.32	0.10	2.87	0.53	2.35	1.53	0.38	0.71	0.20	1.074
Year .....	24.02	27.72	21.19	23.17	21.67	27.28	23.79	30.24	25.34	26.10	21.80	23.18	49.69	25.50	23.42	25.85	20.47	26.59	24.75	22.62	32.09	.....	29.31	30.03	30.13	30.21	15.79	14.85	38.14	27.89	33.13	31.23	31.82	30.68	30.63	31.27	33.74	35.51	30.66	23.67	28.80	22.78	32.39	29.76	39.06	23.14	26.70	26.11	25.33	22.89	25.85	25.86	16.96	23.38	21.79	22.73	25.95	25.89	24.26	34.72	30.52	27.500

\*Rainfall for October, 1842, estimated.

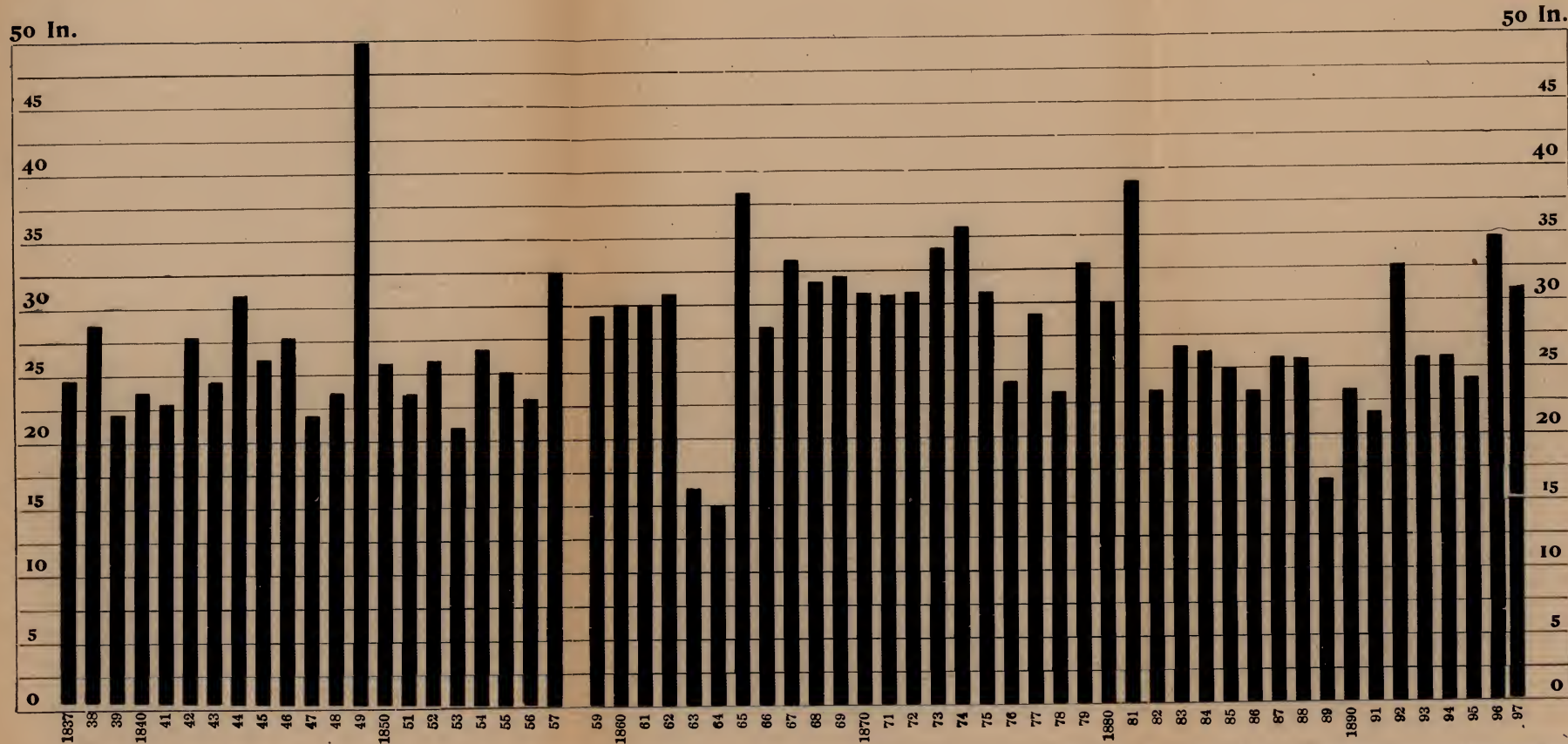
Note.—The records from 1837 to 1854 are from observations taken at Fort Snelling and published by the government in 1855 ("Metecrological Observations by the Medical Corps, U. S. A." Historical Library, St. Paul, Minn.). The records from 1854 to 1857 were obtained from U. S. Engineer's office, St. Paul; from 1859 to 1871 from Rev. A. B. Patterson's meteorological record (Historical Library, St. Paul), and from 1871 to date from U. S. Signal Service, St. Paul.

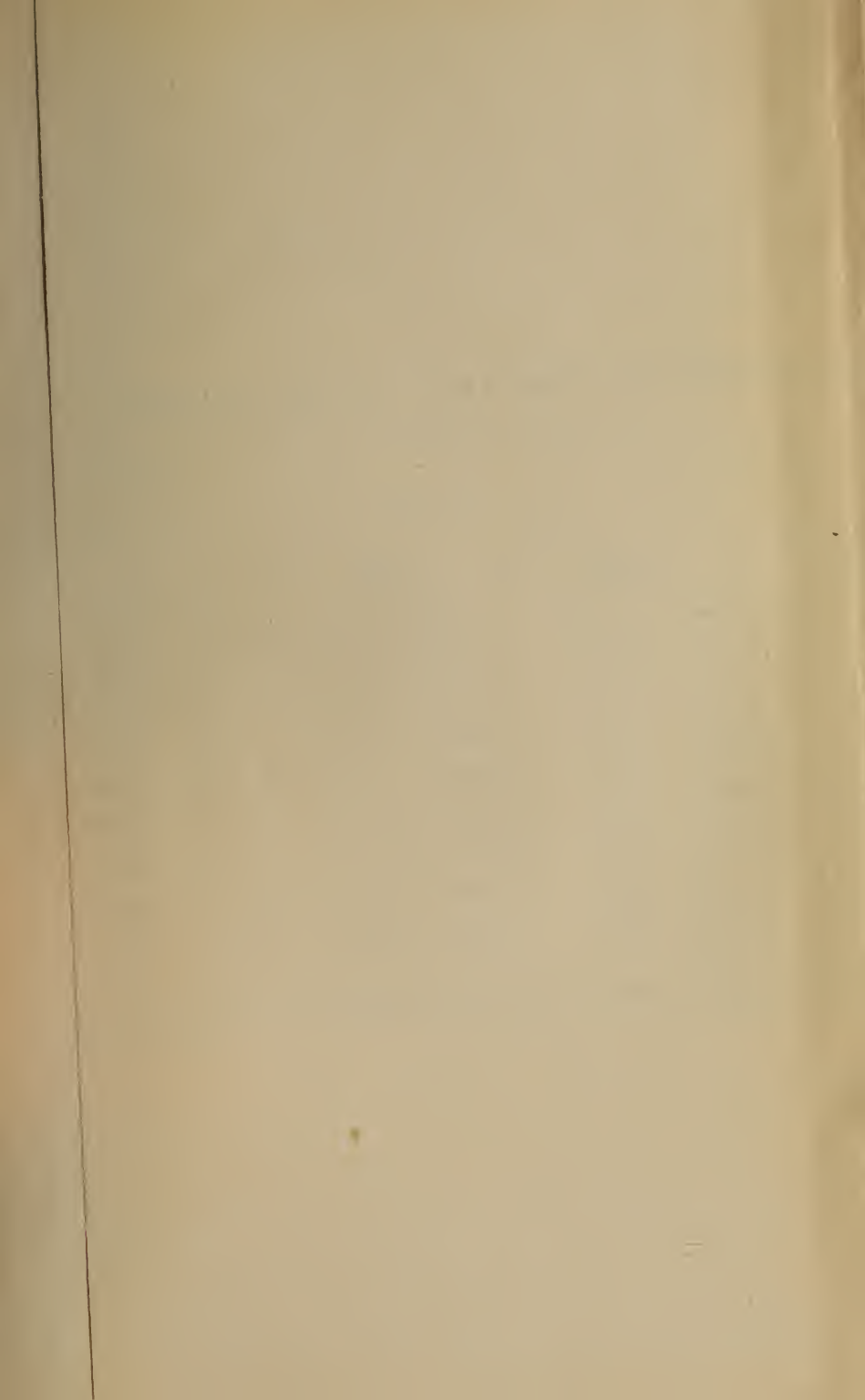






# ANNUAL PRECIPITATION, ST. PAUL, MINN., FROM 1837 TO DATE.





# CONSUMPTION OF WATER OF THE CITY OF ST. PAUL FOR THE YEAR 1897.

MONTH.	FROM VADNAIS LAKE.		FROM ARTESIAN WELLS.		FROM LAKE PHALEN.		TOTAL SUPPLY.		HIGH SERVICE.		LOW SERVICE.					
											Low Service.		West St. Paul High Service.		Total Low Service.	
	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.	Total.	Daily Average.
January.....	204,519,000	6,597,387	.....	.....	14,859,265	479,381	219,378,265	7,076,718	97,474,600	3,144,342	121,427,745	3,917,024	475,920	15,352	121,903,665	3,932,376
February.....	180,958,000	6,462,785	.....	.....	13,012,330	464,727	193,970,330	6,927,512	86,734,100	3,097,646	106,833,570	3,815,486	402,660	14,380	107,236,230	3,829,866
March.....	204,463,000	6,595,581	.....	.....	13,606,280	438,912	218,069,280	7,034,493	98,198,100	3,167,680	119,441,723	3,852,959	429,480	13,854	119,871,180	3,866,813
April.....	189,566,000	6,318,867	.....	.....	11,912,700	397,090	201,478,700	6,715,957	86,958,300	2,898,610	113,901,740	3,796,724	618,660	20,623	114,520,400	3,817,347
May.....	250,694,000	8,086,903	.....	.....	14,673,000	473,322	265,367,000	8,560,225	121,950,040	3,933,872	141,437,680	4,562,506	1,979,280	63,847	143,416,960	4,626,353
June.....	242,406,000	8,080,200	.....	.....	13,749,160	458,305	256,155,160	8,538,505	127,402,900	4,246,763	127,133,740	4,237,958	1,613,520	53,784	128,752,260	4,291,742
July.....	232,289,000	7,493,193	.....	.....	12,945,753	417,605	245,234,753	7,910,798	121,794,500	3,923,854	121,500,753	3,919,880	1,939,500	62,564	123,440,253	3,981,944
August.....	202,137,000	6,520,548	11,617,056	374,743	12,446,804	401,509	226,200,860	7,296,800	120,835,000	3,897,903	108,311,880	3,332,640	2,053,980	66,257	105,365,860	3,398,897
September.....	93,508,000	3,116,933	103,665,200	3,455,506	12,403,921	418,464	209,577,121	6,985,903	107,770,500	3,592,350	99,454,741	3,315,157	2,351,880	78,396	101,806,621	3,393,553
October.....	82,425,000	2,658,871	118,025,100	3,807,261	11,741,393	378,754	212,191,493	6,844,886	116,159,200	3,747,071	93,854,113	3,027,552	2,178,180	70,263	96,032,293	3,097,815
November.....	137,091,000	4,569,700	56,992,000	1,899,733	10,506,000	350,200	204,589,000	6,819,733	95,807,400	3,193,580	107,530,600	3,584,350	1,251,000	41,700	108,781,600	3,626,050
December.....	204,824,000	6,607,225	.....	.....	15,786,100	509,228	220,610,100	7,116,452	99,227,700	3,200,893	120,658,260	3,892,202	724,140	23,359	121,382,400	3,915,561
	2,224,880,000	6,095,561	290,299,356	795,341	157,642,706	431,898	2,672,822,062	7,322,800	1,280,312,340	3,507,705	1,376,491,545	3,771,209	16,018,200	43,886	1,392,509,722	3,815,095

# CHIEF ENGINEER'S REPORT.

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ST. PAUL, Dec. 31, 1897.

*To the Honorable President and Members of Water Commissioners:*

I respectfully submit to the honorable board my thirteenth annual report of the operation of the four pumping stations for the year 1897.

McCarron lake station has been in continual operation. All the machinery and boilers are in good condition, and have not required any general repairs.

The West Side station has been in continual operation and has not required any repairs.

Vadnais lake station has been in operation seventy-one days.

Centerville lake station was in operation ninety days.

The following tabulated record shows the operation of the different stations:

## McCarron Lake Station—

Total gallons pumped.....	1,280,312,700
Daily average gallons pumped.....	3,507,200
Total pounds of coal used.....	2,089,819
Daily average coal used.....	5,725
Daily decrease since 1896 (gallons).....	663,315

## West Side Station—

Total number of gallons pumped.....	16,018,200
Daily average gallons pumped.....	43,885
Total pounds coal used.....	229,800
Daily average coal used.....	629
Daily increase since 1896.....	10,064

## Vadnais Lake Station—

Total gallons pumped.....	349,800,000
Daily average .....	4,836,159
Total pounds of coal.....	195,950
Daily average coal.....	2,728

## Centerville Lake Station—

Total gallons pumped.....	112,295,278
Total pounds coal used.....	76,125

Respectfully submitted,

M. FEIST,  
Chief Engineer.

ST. PAUL WATER WORKS PUMPING STATION, McCARRON LAKE.  
ENGINEER'S REPORT FOR YEAR ENDING DECEMBER 30, 1897.

MONTHS—1897.	NUMBER OF HOURS PUMPED.			NUMBER OF REVOLUTIONS.			NUMBER OF GALLONS PUMPED.			Total per Month Pumped. Eng. 1, 2, 3.	Average per Day Pumped.	Total Coal Used per Month.	Average Coal Used per Day.
	Eng.		Eng. No. 3.	Eng.		Eng. No. 3.	Eng.		Eng. No. 3.				
	No. 1.	No. 2.		No. 1.	No. 2.		No. 1.	No. 2.					
January.....	288	554	.....	582,600	404,600	.....	39,616,800	57,857,800	97,474,600	3,134,664	199,310	6,429	
February.....	78	586	206,000	.....	560,300	6,611,200	.....	80,122,900	86,734,100	3,097,646	160,621	5,736	
March.....	.....	744	.....	.....	686,700	.....	.....	98,198,100	98,198,100	3,167,680	171,023	5,516	
April.....	.....	716	.....	.....	608,100	.....	.....	86,958,300	86,958,300	2,898,600	134,553	4,485	
May.....	.....	710	.....	.....	852,800	.....	.....	121,950,400	121,950,400	3,933,883	184,183	5,941	
June.....	62	162½	133,700	334,600	701,900	4,278,400	22,752,800	100,371,700	127,402,900	4,022,000	209,216	6,973	
July.....	7	65	18,600	143,100	779,500	595,200	9,730,800	111,468,500	121,794,500	3,928,854	179,669	5,763	
August.....	.....	744	.....	.....	845,000	.....	.....	120,835,000	120,835,000	3,897,903	175,463	5,690	
September.....	69	105	122,200	194,300	633,900	3,910,400	13,212,400	90,617,700	107,770,500	3,592,350	170,668	5,688	
October.....	.....	47	.....	89,800	759,600	.....	6,105,400	110,032,800	116,159,200	3,747,071	176,541	5,695	
November.....	.....	125	.....	256,100	548,200	.....	17,414,800	78,392,600	95,807,400	3,193,500	162,876	5,429	
December.....	.....	.....	.....	.....	693,900	.....	.....	99,227,700	99,227,700	3,200,893	163,696	5,345	
Total.....	216½	792½	7,940	481,100	1,600,500	8,084,500	15,395,200	108,834,000	1,156,083,500	1,280,312,700	3,507,200	2,089,819	5,725

Total gallons pumped..... 1,280,312,700  
 Daily average gallons pumped..... 3,507,200  
 Total pounds of coal used..... 2,089,819  
 Daily average coal used..... 5,725  
 Daily decrease since 1896—Gal. .... 663,315

MARTIN FEIST,

Chief Engineer.



## ST. PAUL WATER WORKS PUMPING STATION, WEST SIDE.

ENGINEER'S REPORT FOR YEAR ENDING DECEMBER 31, 1897.

MONTHS.	Number of Hours Pumped.	Number of Revolu- tions.	Total Number of Gallons Pumped.	Daily Average Gallons Pumped.	Total Pounds Coal Used.	Average Coal per Day Used.	Average Pressure.
1897.							
January .....	10.31	26,440	475,920	15,352	19,000	612	91
February .....	9.60	22,370	402,660	14,380	16,150	576	91
March .....	9.41	23,860	429,480	13,854	17,000	548	91
April .....	13.34	34,370	618,660	20,622	14,600	486	91
May .....	42.24	109,960	1,979,280	63,847	21,850	705	91
June .....	35.20	89,640	1,613,520	53,784	18,600	620	91
July .....	41.48	107,750	1,939,500	62,564	20,700	667	91
August .....	43.39	114,110	2,053,980	66,257	21,100	680	91
September .....	50.36	130,660	2,351,880	78,396	22,100	736	91
October .....	47.00	121,010	2,178,180	70,263	22,000	710	91
November .....	26.53	69,500	1,251,000	41,700	18,400	613	91
December .....	15.30	40,230	724,140	23,359	18,300	590	91
Total .....	34.85	889,900	16,018,200	43,885	229,800	629	91

Total number gallons pumped.....	16,018,200
Daily average gallons pumped.....	43,885
Total pounds of coal used.....	229,800
Daily average coal used.....	629
Daily increase since 1896.....	10,064

ST. PAUL WATER WORKS PUMPING STATION, VADNAIS LAKE.  
ENGINEER'S REPORT FOR YEAR ENDING DECEMBER 31, 1897.

MONTHS.	Number of Hours Pumped.	Number of Revol- utions.	Number of Gallons Pumped.	Daily Average Gallons Pumped.	Total Coal Used.	Daily Aver- age Coal.	Aver- age on Suc- tion.
1897.							
January .....							
February .....							
March .....							
April .....							
May .....							
June .....							
July .....							
August .....	69	154,400	13,587,200	4,529,066	8,300	2,766	10½
September .....	668	1,556,200	136,945,600	4,890,914	74,500	2,660	10½
October .....	674½	1,548,200	136,241,600	4,865,771	76,500	2,732	10½
November .....	299	716,200	63,025,600	5,058,888	36,650	2,756	10½
December .....							
Total .....	1,710½	3,975,000	349,800,000	4,836,159	195,950	2,728	10½

Total gallons pumped.....	349,800,000
Daily average gallons pumped.....	4,836,159
Total pounds of coal used.....	195,950
Daily average coal used.....	2,728

ST. PAUL WATER WORKS PUMPING STATION,  
CENTERVILLE LAKE.

ENGINEER'S REPORT FOR YEAR ENDING DECEMBER 31, 1897.

MONTHS.	Number of Hours Pumped.	Number of Revolu- tions.	Number of Gallons Pumped.	Daily Average Pumped	Total Pounds Coal Used.
1897.					
January .....	38¾	35,900	12,995,800	1,443,977	22,300
February .....					*5,100
March .....					*8,350
April .....					
May .....	5	5,760	2,085,120		1,600
June .....	7½	9,018	3,264,516	652,915	3,285
July .....	41½	43,821	15,863,202	1,586,320	8,300
August .....	118½	187,827	67,993,374	7,570,463	26,390
September .....					
October .....	23¼	22,844	8,269,528		4,700
November .....	5	5,041	1,824,842		†1,200
December .....					
Total .....	239½	310,211	112,296,382		81,225

\*Coal for heating building.

†Testing well.

Total gallons pumped..... 112,295,278  
Total pounds coal used..... 81,225

# CITY TREASURER'S REPORT.

OFFICE OF THE CITY TREASURER,  
ST. PAUL, MINN., Jan. 22, 1898.

*To the Honorable Board of Water Commissioners,*

GENTLEMEN: I herewith submit the annual report of the receipts and disbursements of the water department for the year ending Dec. 31, 1897.

## RECEIPTS.

Balance on hand Jan. 1, 1897.....	\$12,189.92
Cash .....	304,459.11

## DISBURSEMENTS.

Cash .....	\$301,748.55
Balance on hand Jan. 1, 1898.....	14,900.48
	<hr/>
	\$316,649.03
	<hr/>
	\$316,649.03

## WATER DEPARTMENT SINKING FUND.

### CR.

Balance on hand Jan. 1, 1897.....	\$2,090.71
Cash invested by Water Board.....	75,000.00
Cash for redeemed tax levy certificates of indebtedness .....	363,500.00
Cash interest on bonds.....	2,000.00
Cash interest on certificates of indebtedness.....	19,535.03
General fund interest on \$49,250 to September 1st .....	175.11
General fund error on June 19, 1897.....	11.92
General fund interest on balance October, 1896, to March, 1897 .....	37.11

### DR.

To investment in registered city bonds.....	\$150,000.00
To tax levy certificates of indebtedness.....	304,000.00
To interest on balance overdrawn account.....	824.80
To balance on hand Jan. 1, 1898.....	7,525.08
	<hr/>
	\$462,340.88
	<hr/>
	\$462,340.88

Respectfully submitted,

C. L. HORST,  
City Treasurer.













UNIVERSITY OF ILLINOIS-URBANA



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